

**Symphonic**

**SYLVANIA**  
**DURABRAND**

# SERVICE MANUAL

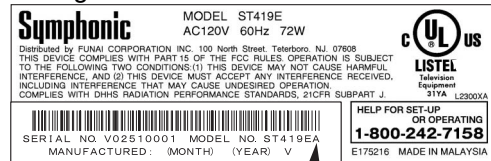
**Subject: Change of IF Signal Process IC**

This service manual supplement is for the ST413E/6413TE/DWT1304/ST419E/6419TE changed IC model, which are different from the previous ST413E/6413TE/DWT1304/ST419E/6419TE model. For the ST413E/6413TE/DWT1304/ST419E/6419TE changed IC model, an "A" has been added to the end of the model number on rating label in the rear. Refer to the rating label illustration at right.

This service manual shows only the differences between the model ST413E/6413TE/DWT1304/ST419E/6419TE changed IC model and the previous ST413E/6413TE/DWT1304/ST419E/6419TE model. All other information is described in the service manual of the previous ST413E/6413TE/DWT1304/ST419E/6419TE model.

Example: ST419E

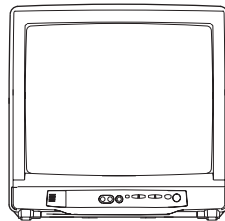
Rating label



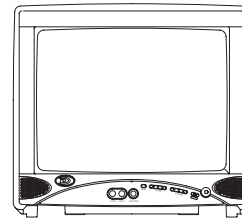
Suffix "A"

## 13" COLOR TELEVISION

**ST413E/6413TE**

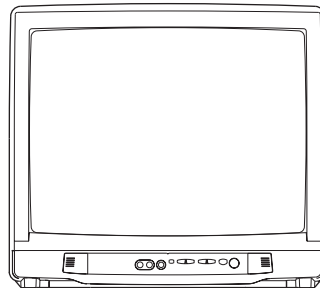


**DWT1304**



## 19" COLOR TELEVISION

**ST419E/6419TE**



# IMPORTANT SAFETY NOTICE

Proper service and repair is important to the safe, reliable operation of all Funai Equipment. The service procedures recommended by Funai and described in this service manual are effective methods of performing service operations. Some of these service special tools should be used when and as recommended.

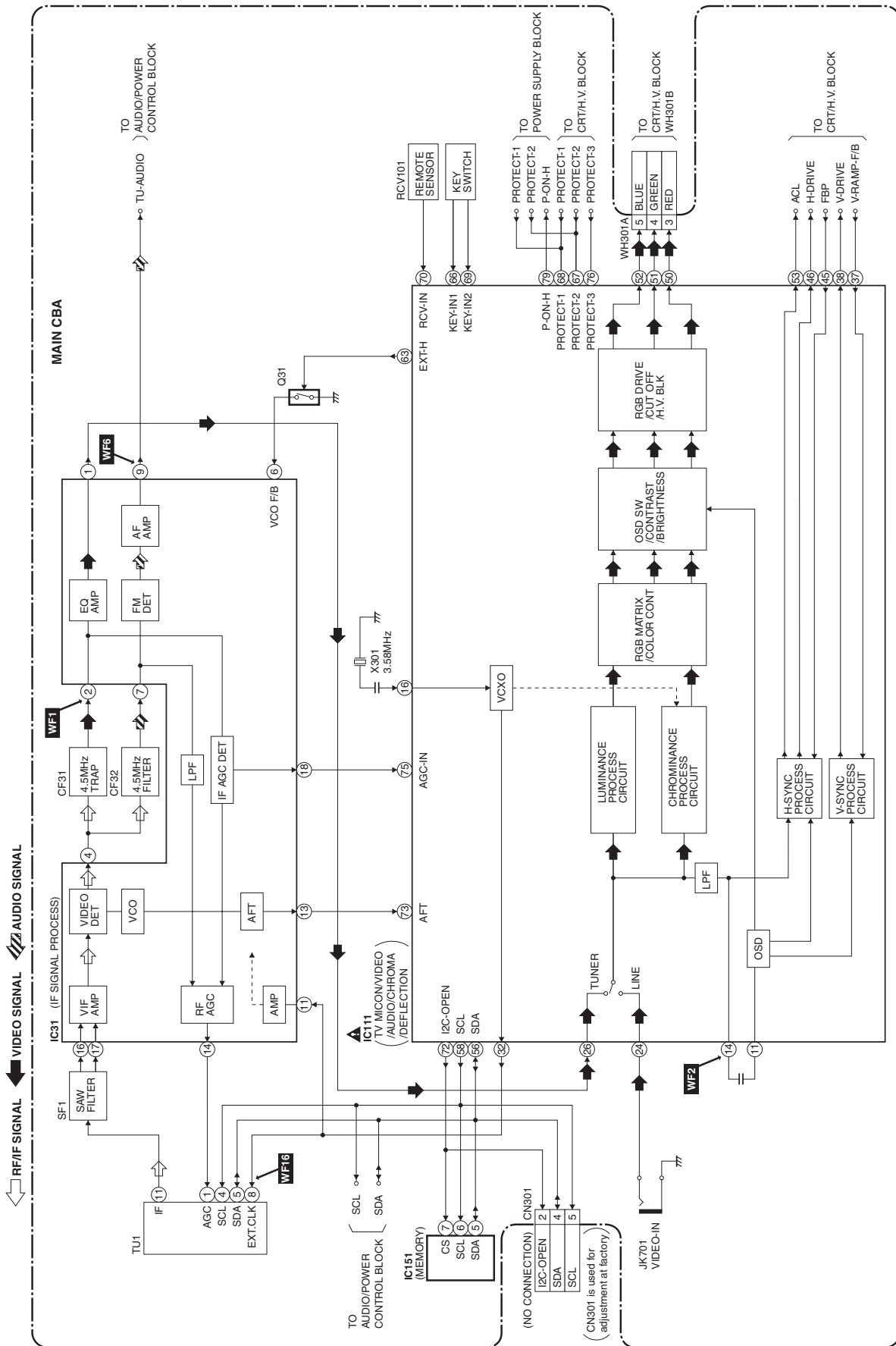
It is important to note that this service manual contains various CAUTIONS and NOTICES which should be carefully read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper service methods may damage the equipment. It also is important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Funai could not possibly know, evaluate and advise the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Funai has not undertaken any such broad evaluation. Accordingly, a servicer who uses a service procedure or tool which is not recommended by Funai must first use all precautions thoroughly so that neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

## TABLE OF CONTENTS

Block Diagrams . . . . .	1-1
Schematic Diagrams / CBA's and Test Points . . . . .	2-1
ST413E changed IC model	
Different parts from the previous version model (ST413E) . . . . .	3-1
6413TE changed IC model	
Different parts from the previous version model (6413TE) . . . . .	3-1
DWT1304 changed IC model	
Different parts from the previous version model (DWT1304) . . . . .	3-1
ST419E changed IC model	
Different parts from the previous version model (ST419E) . . . . .	3-2
6419TE changed IC model	
Different parts from the previous version model (6419TE) . . . . .	3-2

# BLOCK DIAGRAMS

## IF/Video/System Control Block Diagram



# SCHEMATIC DIAGRAMS / CBA'S AND TEST POINTS

## Standard Notes

Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the mark "▲" in the schematic diagram and the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts that do not have the same safety characteristics as specified in the parts list may create shock, fire, or other hazards.

### Note:

1. Do not use the part number shown on these drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since these drawings were prepared.
2. All resistance values are indicated in ohms ( $K=10^3$ ,  $M=10^6$ ).
3. Resistor wattages are 1/4W or 1/6W unless otherwise specified.
4. All capacitance values are indicated in  $\mu F$  ( $P=10^{-6}\mu F$ ).
5. All voltages are DC voltages unless otherwise specified.

### Note of Capacitors:

ML --- Mylar Cap.    PP --- Metallized Film Cap.    SC --- Semiconductor Cap.    L --- Low Leakage type

### Temperature Characteristics of Capacitors are noted with the following:

B ---  $\pm 10\%$     CH ---  $0\pm 60\text{ppm}/^\circ\text{C}$     CSL ---  $+350\sim -1000\text{ppm}/^\circ\text{C}$

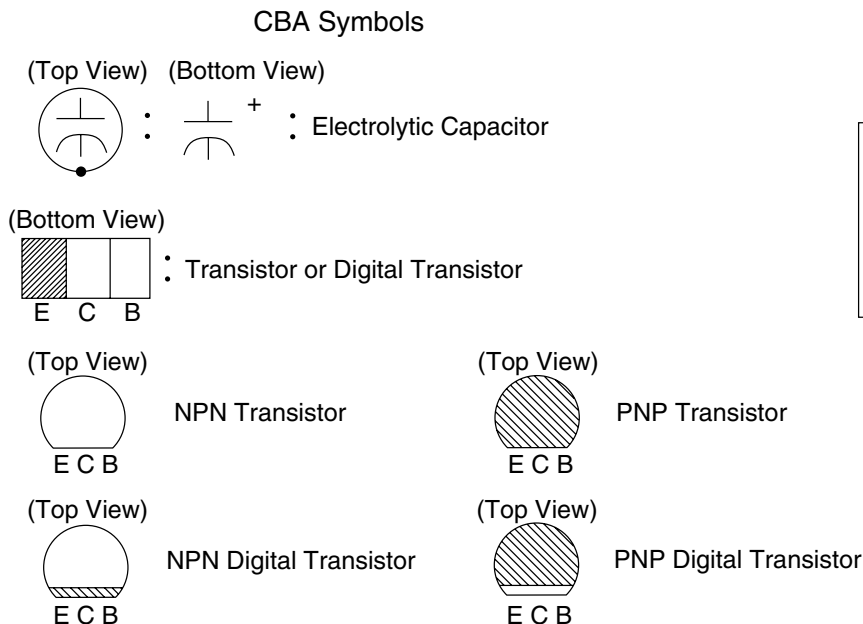
### Tolerance of Capacitors are noted with the following:

Z ---  $+80\sim -20\%$

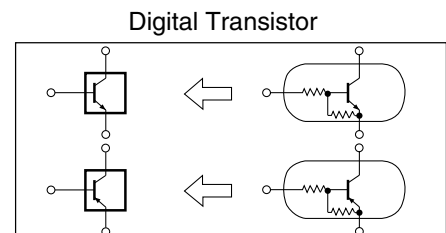
### Note of Resistors:

CEM --- Cement Res.    MTL --- Metal Res.    F --- Fuse Res.

### Capacitors and transistors are represented by the following symbols.



### Schematic Diagram Symbols



**LIST OF CAUTION, NOTES, AND SYMBOLS USED IN THE SCHEMATIC DIAGRAMS ON THE FOLLOWING PAGES:**

**1. CAUTION:** FOR CONTINUED PROTECTION AGAINST RISK OF FIRE, REPLACE ONLY WITH SAME TYPE\_A,\_V FUSE.

**ATTENTION:** UTILISER UN FUSIBLE DE RECHANGE DE MÊME TYPE DE\_A,\_V.

**2. CAUTION:**

Fixed Voltage (or Auto voltage selectable) power supply circuit is used in this unit.

If Main Fuse (F601) is blown, first check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

**3. Note:**

(1) Do not use the part number shown on the drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since the drawings were prepared.

(2) To maintain original function and reliability of repaired units, use only original replacement parts which are listed with their part numbers in the parts list section of the service manual.

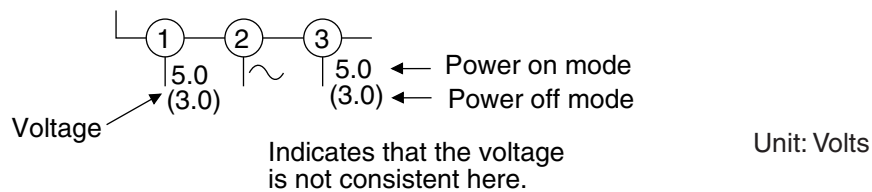
**4. Wire Connectors**

(1) Prefix symbol "CN" means "connector" (can disconnect and reconnect).

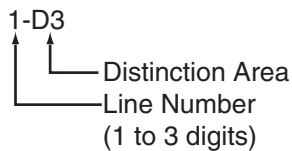
(2) Prefix symbol "CL" means "wire-solder holes of the PCB" (wire is soldered directly).

**5. Voltage indications on the schematics are as shown below:**

Plug the TV power cord into a standard AC outlet.:



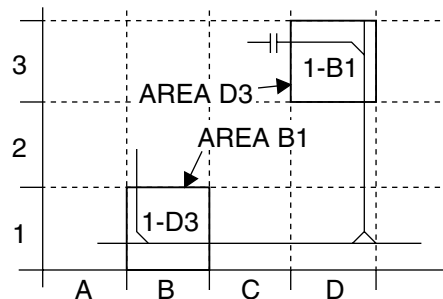
**6. How to read converged lines**



Examples:

1. "1-D3" means that line number "1" goes to the line number "1" of the area "D3".

2. "1-B1" means that line number "1" goes to the line number "1" of the area "B1".



**7. Test Point Information**

⊙ : Indicates a test point with a jumper wire across a hole in the PCB.

□→ : Used to indicate a test point with a component lead on foil side.

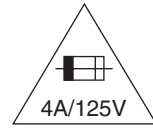
⊘ : Used to indicate a test point with no test pin.

● : Used to indicate a test point with a test pin.

# Main 2/3 Schematic Diagram

### CAUTION !

Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.  
If Main Fuse (F601) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.  
Otherwise it may cause some components in the power supply circuit to fail.



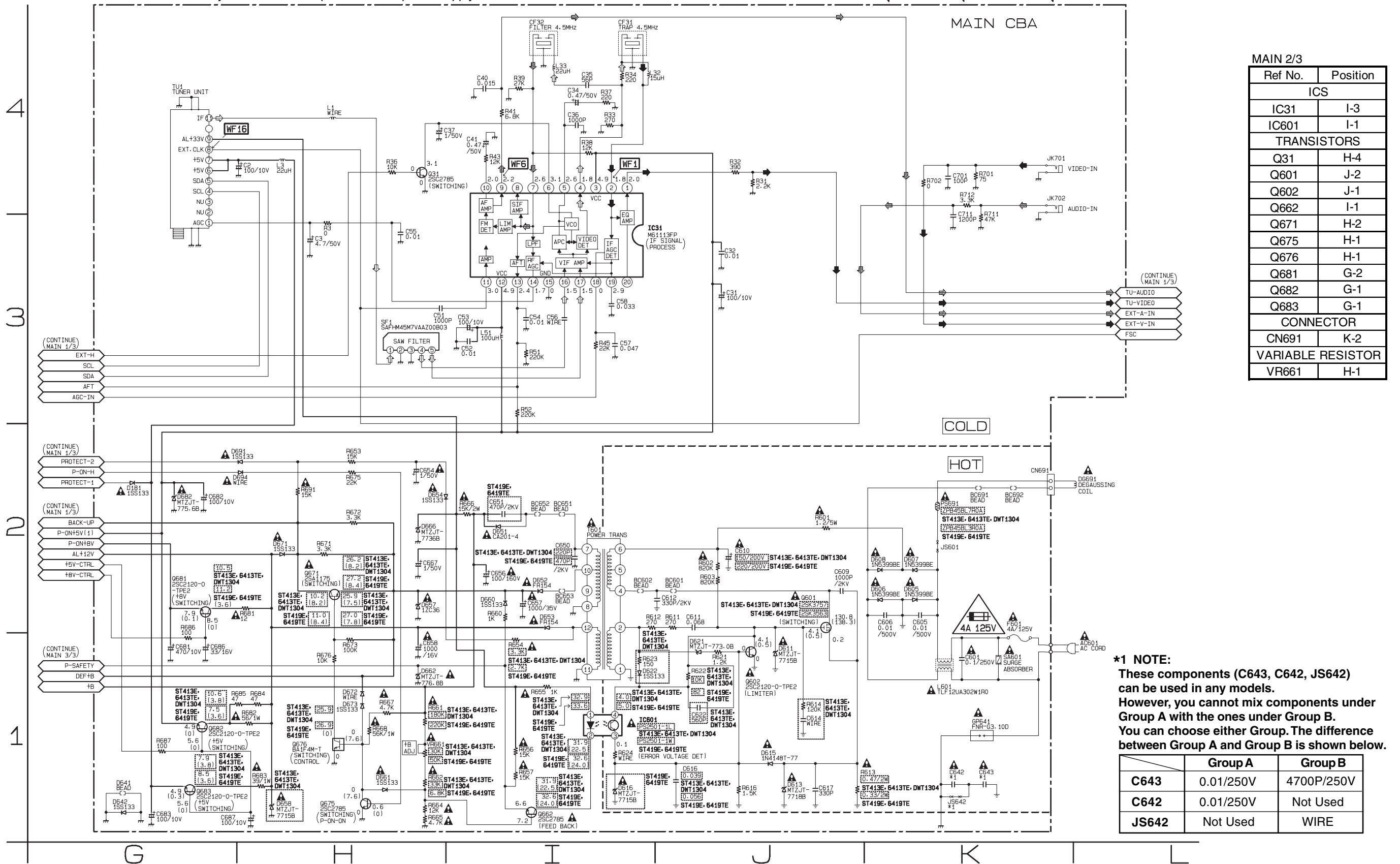
**CAUTION ! :** For continued protection against risk of fire, replace only with same type 4 A, 125V fuse.

**ATTENTION :** Utiliser un fusible de rechange de même type de 4A, 125V.

### NOTE:

The voltage for parts in hot circuit is measured using hot GND as a common terminal.

IF SIGNAL    VIDEO SIGNAL    AUDIO SIGNAL



Ref No.	Position
ICs	
IC31	I-3
IC601	I-1
TRANSISTORS	
Q31	H-4
Q601	J-2
Q602	J-1
Q662	I-1
Q671	H-2
Q675	H-1
Q676	H-1
Q681	G-2
Q682	G-1
Q683	G-1
CONNECTOR	
CN691	K-2
VARIABLE RESISTOR	
VR661	H-1

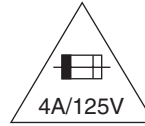
**\*1 NOTE:**  
These components (C643, C642, JS642) can be used in any models.  
However, you cannot mix components under Group A with the ones under Group B.  
You can choose either Group. The difference between Group A and Group B is shown below.

	Group A	Group B
C643	0.01/250V	4700P/250V
C642	0.01/250V	Not Used
JS642	Not Used	WIRE

# Main CBA Top View

## CAUTION !

Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F601) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

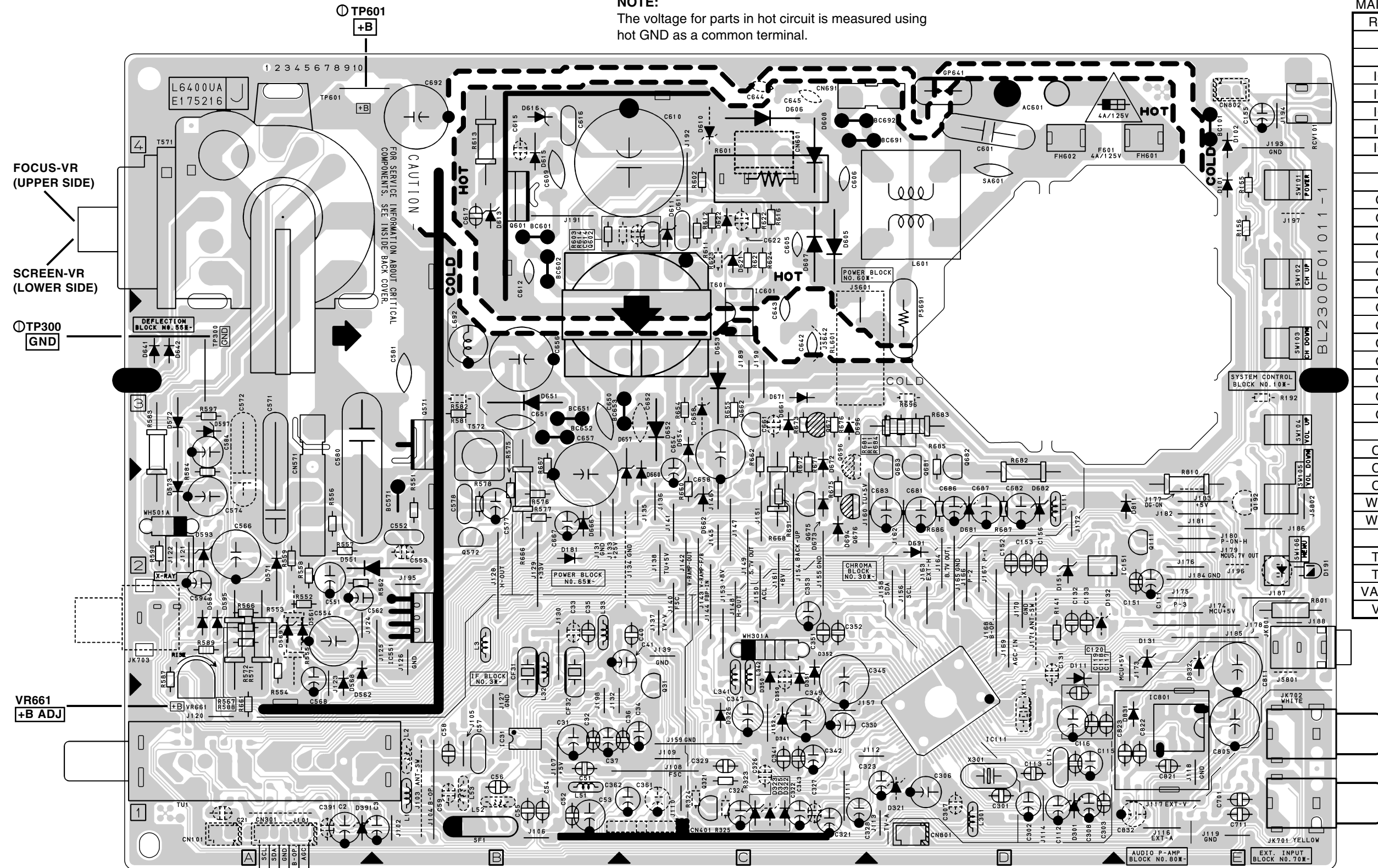


**CAUTION ! :** For continued protection against risk of fire, replace only with same type 4 A, 125V fuse.  
**ATTENTION :** Utiliser un fusible de rechange de même type de 4A, 125V.

Because a hot chassis ground is present in the power supply circuit, an isolation transformer must be used. Also, in order to have the ability to increase the input slowly, when troubleshooting this type power supply circuit, a variable isolation transformer is required.

## NOTE:

The voltage for parts in hot circuit is measured using hot GND as a common terminal.



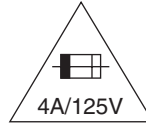
## MAIN CBA

Ref No.	Position
ICs	
IC31	B-1
IC111	D-1
IC151	E-2
IC551	B-2
IC601	C-4
IC801	E-1
TRANSISTORS	
Q31	C-1
Q111	E-2
Q321	C-1
Q571	B-3
Q572	B-2
Q601	B-4
Q602	B-4
Q662	C-3
Q671	C-3
Q675	C-2
Q676	C-2
Q681	D-3
Q682	D-3
Q683	D-3
CONNECTORS	
CN571	A-3
CN691	C-4
CN801	D-1
WH301A	C-2
WH501A	A-2
TEST POINTS	
TP300	A-3
TP601	A-4
VARIABLE RESISTOR	
VR661	A-1

# Main CBA Bottom View

## CAUTION !

Fixed voltage (or Auto voltage selectable) power supply circuit is used in this unit.  
 If Main Fuse (F601) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.  
 Otherwise it may cause some components in the power supply circuit to fail.

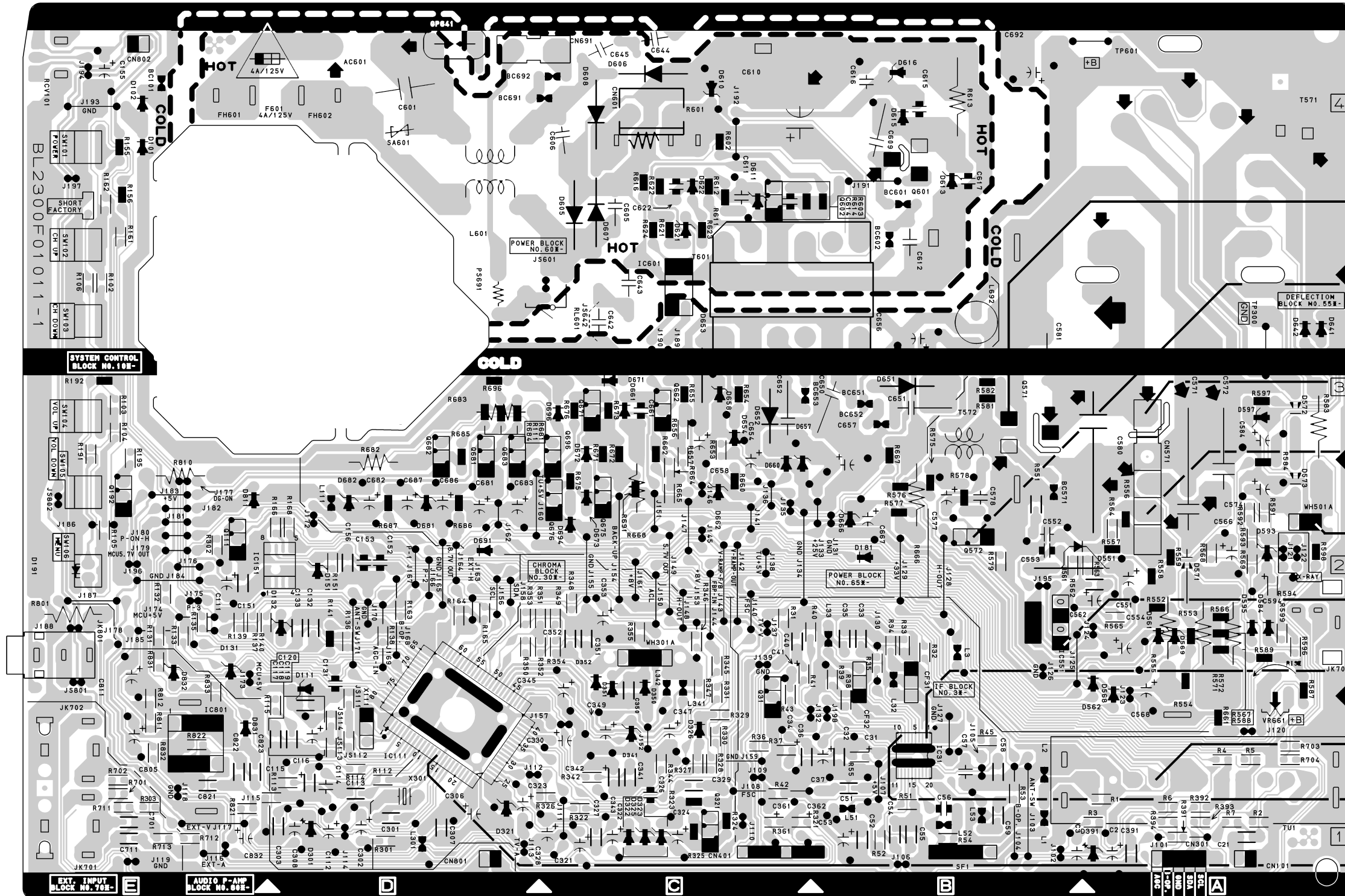


**CAUTION ! :** For continued protection against risk of fire, replace only with same type 4 A, 125V fuse.  
**ATTENTION :** Utiliser un fusible de rechange de même type de 4A, 125V.

## NOTE:

The voltage for parts in hot circuit is measured using hot GND as a common terminal.

Because a hot chassis ground is present in the power supply circuit, an isolation transformer must be used. Also, in order to have the ability to increase the input slowly, when troubleshooting this type power supply circuit, a variable isolation transformer is required.



- WF8** Q571 Base
- WF7** Q572 Collector
- WF9** PIN 1 OF CN571
- WF12** PIN 4 OF CN571
- WF10** PIN 3 OF WH501A
- WF11** PIN 7 OF IC551
- WF1** PIN 2 OF IC31
- WF16** PIN 8 OF TU1
- WF6** PIN 9 OF IC31
- WF2** PIN 14 OF IC111

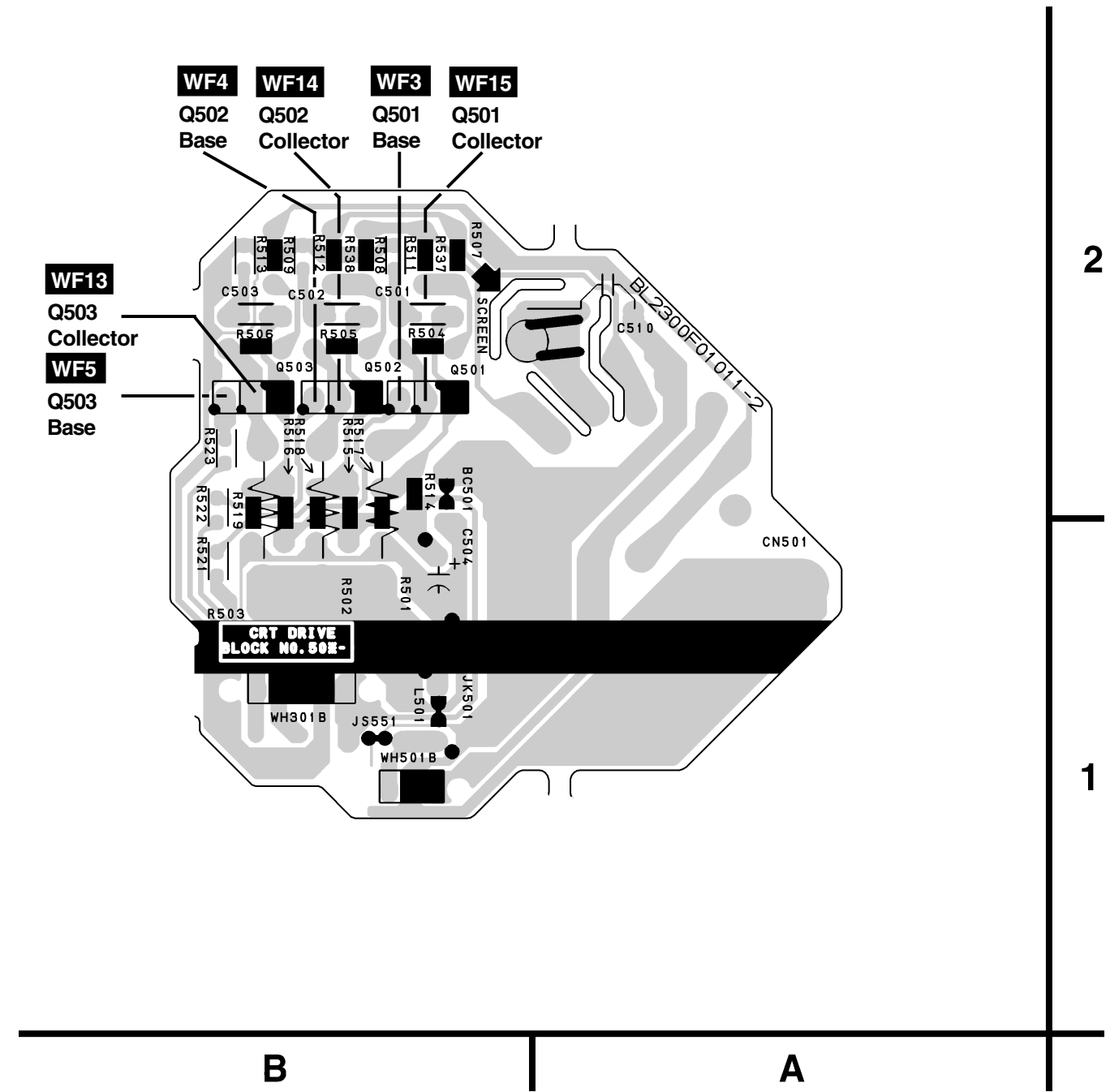
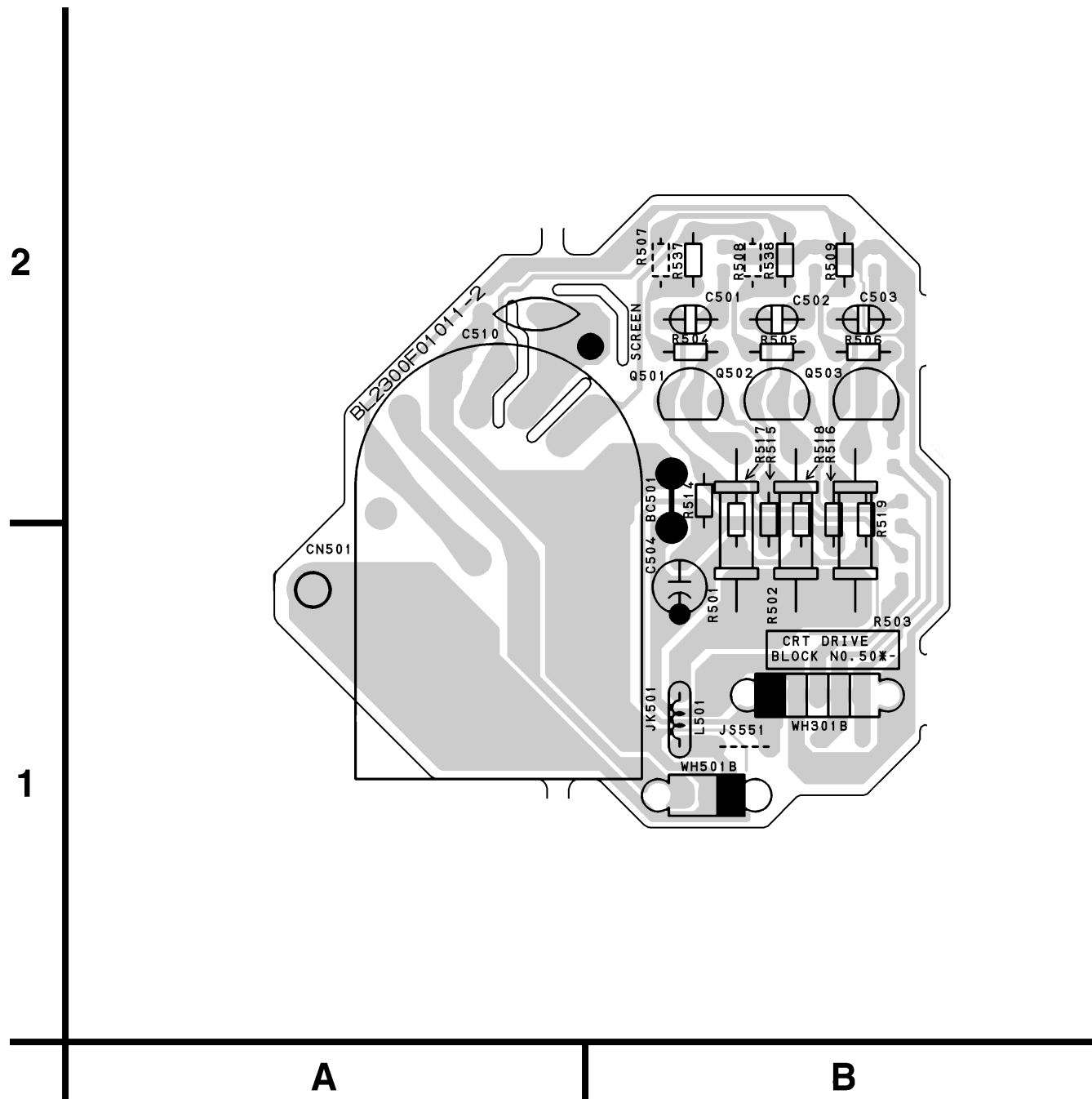


# CRT CBA Top View

# CRT CBA Bottom View

CRT CBA

Ref No.	Position
TRANSISTORS	
Q501	B-2
Q502	B-2
Q503	B-2
CONNECTORS	
CN501	A-1
WH301B	B-1
WH501B	B-1



## ST413E changed IC model

### Different parts from the previous version model (ST413E)

Ref. No.	Description	Part No.
MECHANICAL PARTS		
A4▲	RATING LABEL L2200XA	-----
S6	SERIAL NO. LABEL L2200XA	-----
ELECTRICAL PARTS		
	MMA CBA	0ESA05976
	MAIN CBA	-----
C38	Not Used	
C609	CERAMIC CAP. B K 1000pF/2KV	CCD3DKD0B102
IC31	IC:VIF/SIF M61113FP TFOG	QSZBA0SHT035
R38▲	CHIP RES.(1608) 1/10W J 12k Ω	RRXAJB5Z0123
R132	Not Used	

## 6413TE changed IC model

### Different parts from the previous version model (6413TE)

Ref. No.	Description	Part No.
MECHANICAL PARTS		
A4▲	RATING LABEL L2201XB	-----
S6	SERIAL NO. LABEL L2201XB	-----
ELECTRICAL PARTS		
	MMA CBA	0ESA05976
	MAIN CBA	-----
C38	Not Used	
C609	CERAMIC CAP. B K 1000pF/2KV	CCD3DKD0B102
IC31	IC:VIF/SIF M61113FP TFOG	QSZBA0SHT035
R38▲	CHIP RES.(1608) 1/10W J 12k Ω	RRXAJB5Z0123
R132	Not Used	

## DWT1304 changed IC model

### Different parts from the previous version model (DWT1304)

Ref. No.	Description	Part No.
MECHANICAL PARTS		
A4▲	RATING LABEL L2204XE	-----
S6	SERIAL NO. LABEL L2204XE	-----
ELECTRICAL PARTS		
	MMA CBA	0ESA05976
	MAIN CBA	-----
C38	Not Used	
C609	CERAMIC CAP. B K 1000pF/2KV	CCD3DKD0B102
IC31	IC:VIF/SIF M61113FP TFOG	QSZBA0SHT035
R38▲	CHIP RES.(1608) 1/10W J 12k Ω	RRXAJB5Z0123
R132	Not Used	

## ST419E changed IC model

### Different parts from the previous version model (ST419E)

Ref. No.	Description	Part No.
MECHANICAL PARTS		
A4▲	RATING LABEL L2300XA	-----
S6	SERIAL NO. LABEL L2300XA	-----
ELECTRICAL PARTS		
	MMA CBA	0ESA05979
	MAIN CBA	-----
C38	Not Used	
C609	CERAMIC CAP. B K 1000pF/2KV	CCD3DKD0B102
IC31	IC:VIF/SIF M61113FP TFOG	QSZBA0SHT035
R38▲	CHIP RES.(1608) 1/10W J 12k Ω	RRXAJB5Z0123
R132	Not Used	

## 6419TE changed IC model

### Different parts from the previous version model (6419TE)

Ref. No.	Description	Part No.
MECHANICAL PARTS		
A4▲	RATING LABEL L2301XB	-----
S6	SERIAL NO. LABEL L2301XB	-----
ELECTRICAL PARTS		
	MMA CBA	0ESA05979
	MAIN CBA	-----
C38	Not Used	
C609	CERAMIC CAP. B K 1000pF/2KV	CCD3DKD0B102
IC31	IC:VIF/SIF M61113FP TFOG	QSZBA0SHT035
R38▲	CHIP RES.(1608) 1/10W J 12k Ω	RRXAJB5Z0123
R132	Not Used	





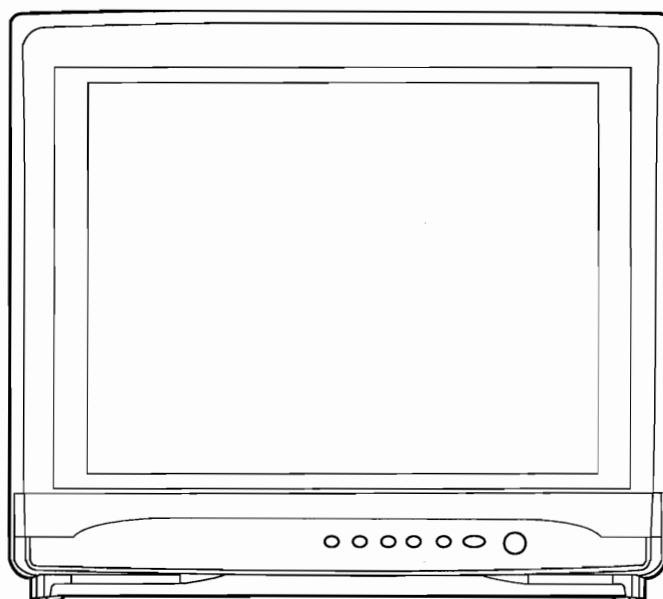
**Symphonic**

**SYLVANIA**

# **SERVICE MANUAL**

**13" COLOR TELEVISION**

**ST413A/F413TA/6413TA**



## IMPORTANT SAFETY NOTICE

Proper service and repair is important to the safe, reliable operation of all Funai Equipment. The service procedures recommended by Funai and described in this service manual are effective methods of performing service operations. Some of these service special tools should be used when and as recommended.

It is important to note that this service manual contains various CAUTIONS and NOTICES which should be carefully read in order to minimize the risk of personal injury to service personnel. The possibility exists that improper service methods may damage the equipment. It also is important to understand that these CAUTIONS and NOTICES ARE NOT EXHAUSTIVE. Funai could not possibly know, evaluate and advise the service trade of all conceivable ways in which service might be done or of the possible hazardous consequences of each way. Consequently, Funai has not undertaken any such broad evaluation. Accordingly, a servicer who uses a service procedure or tool which is not recommended by Funai must first use all precautions thoroughly so that neither his safety nor the safe operation of the equipment will be jeopardized by the service method selected.

## TABLE OF CONTENTS

Specifications .....	1-1	CBA Views and Test Points .....	7-9
Important Safety Precautions.....	2-1	Wave Forms .....	8-1
Standard Notes for Servicing .....	3-1	Wiring Diagram.....	9-1
Cabinet Disassembly Instructions.....	4-1	IC Pin Fuction.....	10-1
Electrical Adjustment Instructions .....	5-1	Cabinet Exploded View .....	11-1
Block Diagram.....	6-1	Packing Exploded View.....	11-3
Schematic Diagram / CBA's and Test Points .....	7-1	Mechanical Parts List.....	12-1
Schematic Diagram .....	7-3	Electrical Parts List.....	13-1

# SPECIFICATIONS

## < TUNER >

ANT. Input ----- 75ohm Unbal., F type  
 Reference Level ----- 20Vp-p (CRT Green Cathode)  
 Test Input Signal ----- 400Hz 30% modulation

Description	Condition	Unit	Nominal	Limit
1. Intermediate Freq.	Picture	MHz	45.75	—
	Sound	MHz	41.25	—
2. Peak Picture Sens	VHF	dB $\mu$ V	15	30
	CATV	dB $\mu$ V	15	30
	UHF	dB $\mu$ V	15	40
3. AFT Pull In Range (10mV input)	—	MHz	$\pm$ 2.0	$\pm$ 0.7

## < DEFLECTION >

Description	Condition	Unit	Nominal	Limit
1. Deflection Freq.	Horizontal	KHz	15.734	—
	Vertical	Hz	60	—
2. Linearity	Horizontal	%	—	$\pm$ 15
	Vertical	%	—	$\pm$ 10
3. Over Scan	—	%	10	—
4. High Voltage	—	KV	23	—

## < VIDEO & CHROMA >

Description	Condition	Unit	Nominal	Limit
1. Misconvergence	Center	mm	—	0.3
	Side	mm	—	1.2
	Corner	mm	—	1.5
2. Brightness	APL 100%	Ft-L	60	40
3. Color Temperature	—	$^{\circ}$ K	9200 $^{\circ}$ K	—
4. Resolution	Horizontal	Line	250	—
	Vertical	Line	300	—

## < AUDIO >

All items are measured across 8 $\Omega$  load at speaker output terminal.

Description	Condition	Unit	Nominal	Limit
1. Audio Output Power	10% THD	W	1	0.8
2. Audio Distortion (w/LPF)	500mW	%	2	7
3. Audio Freq. Response	-3dB	Hz	70~11K	—

### Note:

Nominal specifications represent the design specifications. All units should be able to approximate these. Some will exceed and some may drop slightly below these specifications. Limit specifications represent the absolute worst condition that still might be considered acceptable. In no case should a unit fail to meet limit specifications.

# IMPORTANT SAFETY PRECAUTIONS

Prior to shipment from the factory, our products are strictly inspected for recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

## Safety Precautions for TV Circuit

**1. Before returning an instrument to the customer,** always make a safety check of the entire instrument, including, but not limited to, the following items:

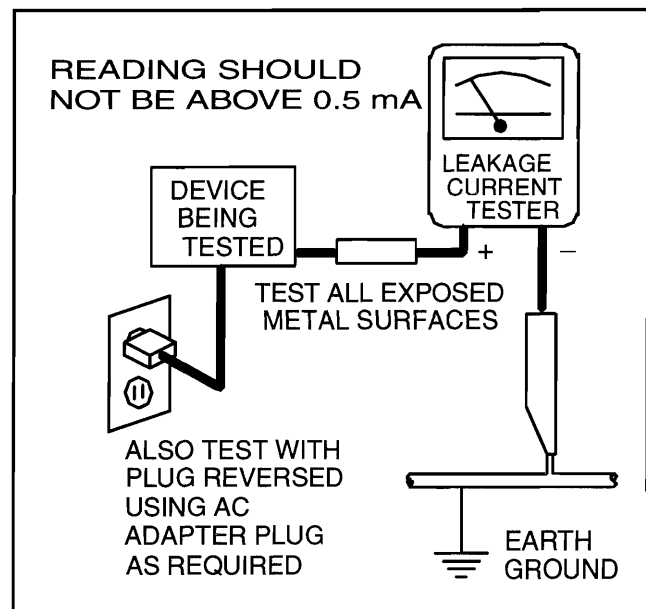
**a.** Be sure that no built-in protective devices are defective and have been defeated during servicing. (1) Protective shields are provided on this chassis to protect both the technician and the customer. Correctly replace all missing protective shields, including any removed for servicing convenience. (2) When reinstalling the chassis and/or other assembly in the cabinet, be sure to put back in place all protective devices, including but not limited to, non-metallic control knobs, insulating fishpapers, adjustment and compartment covers/shields, and isolation resistor/capacitor networks. **Do not operate this instrument or permit it to be operated without all protective devices correctly installed and functioning. Servicers who defeat safety features or fail to perform safety checks may be liable for any resulting damage.**

**b.** Be sure that there are no cabinet openings through which an adult or child might be able to insert their fingers and contact a hazardous voltage. Such openings include, but are not limited to, (1) spacing between the picture tube and the cabinet mask, (2) excessively wide cabinet ventilation slots, and (3) an improperly fitted and/or incorrectly secured cabinet back cover.

**c. Antenna Cold Check** - With the instrument AC plug removed from any AC source, connect an electrical jumper across the two AC plug prongs. Place the instrument AC switch in the on position. Connect one lead of an ohmmeter to the AC plug prongs tied together and touch the other ohmmeter lead in turn to each tuner antenna input exposed terminal screw and, if applicable, to the coaxial connector. If the measured resistance is less than 1.0 megohm or greater than 5.2 megohm, an abnormality exists that must be corrected before the instrument is returned to the customer. Repeat this test with the instrument AC switch in the off position.

**d. Leakage Current Hot Check** - With the instrument completely reassembled, plug the AC line cord directly into a 120V AC outlet. (Do not use an isolation transformer during this test.) Use a leakage

current tester or a metering system that complies with American National Standards Institute (ANSI) C101.1 Leakage Current for Appliances and Underwriters Laboratories (UL) 1410, (50.7). With the instrument AC switch first in the on position and then in the off position, measure from a known earth ground (metal water pipe, conduit, etc.) to all exposed metal parts of the instrument (antennas, handle brackets, metal cabinet, screw heads, metallic overlays, control shafts, etc.), especially any exposed metal parts that offer an electrical return path to the chassis. Any current measured must not exceed 0.5 milli-ampere. Reverse the instrument power cord plug in the outlet and repeat the test.



**ANY MEASUREMENTS NOT WITHIN THE LIMITS SPECIFIED HEREIN INDICATE A POTENTIAL SHOCK HAZARD THAT MUST BE ELIMINATED BEFORE RETURNING THE INSTRUMENT TO THE CUSTOMER OR BEFORE CONNECTING THE ANTENNA OR ACCESSORIES.**

**e. X-Radiation and High Voltage Limits** - Because the picture tube is the primary potential source of X-radiation in solid-state TV receivers, it is specially constructed to prohibit X-radiation emissions. For continued X-radiation protection, the replacement picture tube must be the same type as the original. Also, because the picture tube shields and mounting hardware perform an X-radiation protection function, they must be correctly in place. High voltage must be measured each time servicing



is performed that involves B+, horizontal deflection or high voltage. Correct operation of the X-radiation protection circuits also must be reconfirmed each time they are serviced. (X-radiation protection circuits also may be called "horizontal disable" or "hold down.") Read and apply the high voltage limits and, if the chassis is so equipped, the X-radiation protection circuit specifications given on instrument labels and in the Product Safety & X-Radiation Warning note on the service data chassis schematic. High voltage is maintained within specified limits by close tolerance safety-related components/adjustments in the high-voltage circuit. If high voltage exceeds specified limits, check each component specified on the chassis schematic and take corrective action.

**2.** Read and comply with all caution and safety-related notes on or inside the receiver cabinet, on the receiver chassis, or on the picture tube.

**3. Design Alteration Warning** - Do not alter or add to the mechanical or electrical design of this TV receiver. Design alterations and additions, including, but not limited to circuit modifications and the addition of items such as auxiliary audio and/or video output connections, might alter the safety characteristics of this receiver and create a hazard to the user. Any design alterations or additions will void the manufacturer's warranty and may make you, the servicer, responsible for personal injury or property damage resulting therefrom.

**4. Picture Tube Implosion Protection Warning**

- The picture tube in this receiver employs integral implosion protection. For continued implosion protection, replace the picture tube only with one of the same type number. Do not remove, install, or otherwise handle the picture tube in any manner without first putting on shatterproof goggles equipped with side shields. People not so equipped must be kept safely away while picture tubes are handled. Keep the picture tube away from your body. Do not handle the picture tube by its neck. Some "in-line" picture tubes are equipped with a permanently attached deflection yoke; because of potential hazard, do not try to remove such "permanently attached" yokes from the picture tube.

**5. Hot Chassis Warning** -

**a.** Some TV receiver chassis are electrically connected directly to one conductor of the AC power cord and may be safety-serviced without an isolation transformer only if the AC power plug is inserted so that the chassis is connected to the ground side of the AC power source. To confirm that the AC power plug is inserted correctly, with an AC voltmeter, measure between the chassis and a known earth

ground. If a voltage reading in excess of 1.0V is obtained, remove and reinsert the AC power plug in the opposite polarity and again measure the voltage potential between the chassis and a known earth ground.

**b.** Some TV receiver chassis normally have 85V AC(RS) between chassis and earth ground regardless of the AC plug polarity. This chassis can be safety-serviced only with an isolation transformer inserted in the power line between the receiver and the AC power source, for both personnel and test equipment protection.

**c.** Some TV receiver chassis have a secondary ground system in addition to the main chassis ground. This secondary ground system is not isolated from the AC power line. The two ground systems are electrically separated by insulation material that must not be defeated or altered.

**6.** Observe original lead dress. Take extra care to assure correct lead dress in the following areas: a. near sharp edges, b. near thermally hot parts-be sure that leads and components do not touch thermally hot parts, c. the AC supply, d. high voltage, and e. antenna wiring. Always inspect in all areas for pinched, out of place, or frayed wiring. Check AC power cord for damage.

**7.** Components, parts, and/or wiring that appear to have overheated or are otherwise damaged should be replaced with components, parts, or wiring that meet original specifications. Additionally, determine the cause of overheating and/or damage and, if necessary, take corrective action to remove any potential safety hazard.

**8. Product Safety Notice** - Some electrical and mechanical parts have special safety-related characteristics which are often not evident from visual inspection, nor can the protection they give necessarily be obtained by replacing them with components rated for higher voltage, wattage, etc.. Parts that have special safety characteristics are identified by a ( ▲ ) on schematics and in parts lists. Use of a substitute replacement that does not have the same safety characteristics as the recommended replacement part might create shock, fire, and/or other hazards. The Product's Safety is under review continuously and new instructions are issued whenever appropriate. Prior to shipment from the factory, our products are strictly inspected to confirm with the recognized product safety and electrical codes of the countries in which they are to be sold. However, in order to maintain such compliance, it is equally important to implement the following precautions when a set is being serviced.

## Precautions during Servicing

**A.** Parts identified by the ( ▲ ) symbol are critical for safety.

Replace only with part number specified.

**B.** In addition to safety, other parts and assemblies are specified for conformance with regulations applying to spurious radiation. These must also be replaced only with specified replacements.

Examples: RF converters, RF cables, noise blocking capacitors, and noise blocking filters, etc.

**C.** Use specified internal wiring. Note especially:

- 1) Wires covered with PVC tubing
- 2) Double insulated wires
- 3) High voltage leads

**D.** Use specified insulating materials for hazardous live parts. Note especially:

- 1) Insulation Tape
- 2) PVC tubing
- 3) Spacers
- 4) Insulators for transistors.

**E.** When replacing AC primary side components (transformers, power cord, etc.), wrap ends of wires securely about the terminals before soldering.

**F.** Observe that the wires do not contact heat producing parts (heatsinks, oxide metal film resistors, fusible resistors, etc.)

**G.** Check that replaced wires do not contact sharp edged or pointed parts.

**H.** When a power cord has been replaced, check that 5~6 kg of force in any direction will not loosen it.

**I.** Also check areas surrounding repaired locations.

**J.** Use care that foreign objects (screws, solder droplets, etc.) do not remain inside the set.

**K.** Crimp type wire connector

The power transformer uses crimp type connectors which connect the power cord and the primary side of the transformer. When replacing the transformer, follow these steps carefully and precisely to prevent shock hazards.

Replacement procedure

1) Remove the old connector by cutting the wires at a point close to the connector.

Important: Do not re-use a connector (discard it).

2) Strip about 15 mm of the insulation from the ends of the wires. If the wires are stranded, twist the strands to avoid frayed conductors.

3) Align the lengths of the wires to be connected. Insert the wires fully into the connector.

4) Use the crimping tool to crimp the metal sleeve at the center position. Be sure to crimp fully to the complete closure of the tool.

**L.** When connecting or disconnecting the internal connectors, first, disconnect the AC plug from the AC supply outlet.

## Safety Check after Servicing

Examine the area surrounding the repaired location for damage or deterioration. Observe that screws, parts and wires have been returned to original positions. Afterwards, perform the following tests and confirm the specified values in order to verify compliance with safety standards.

### 1. Clearance Distance

When replacing primary circuit components, confirm specified clearance distance ( $d$ ) and ( $d'$ ) between soldered terminals, and between terminals and surrounding metallic parts. (See Fig. 1)

**Table 1 : Ratings for selected area**

AC Line Voltage	Region	Clearance Distance (d) (d')
110 to 130 V	USA or CANADA	$\geq 3.2$ mm (0.126 inches)

**Note:** This table is unofficial and for reference only. Be sure to confirm the precise values.

### 2. Leakage Current Test

Confirm the specified (or lower) leakage current between B (earth ground, power cord plug prongs) and externally exposed accessible parts (RF terminals, antenna terminals, video and audio input and output terminals, microphone jacks, earphone jacks, etc.) is lower than or equal to the specified value in the table below.

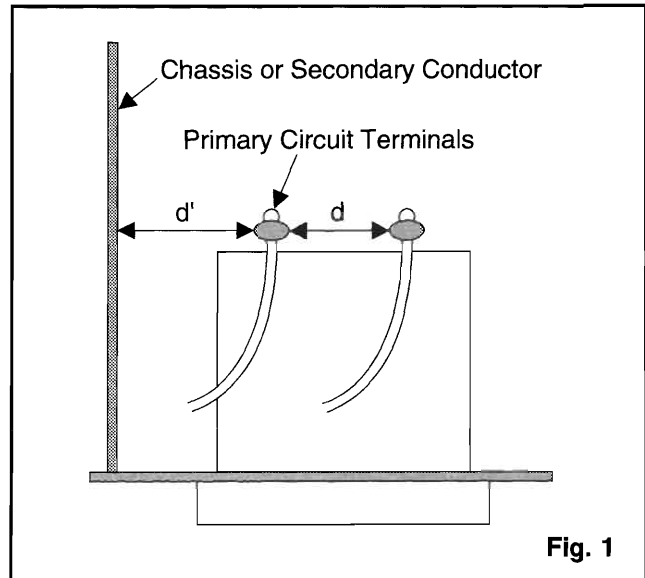
#### Measuring Method : (Power ON)

Insert load Z between B (earth ground, power cord plug prongs) and exposed accessible parts. Use an AC voltmeter to measure across both terminals of load Z. See Fig. 2 and following table.

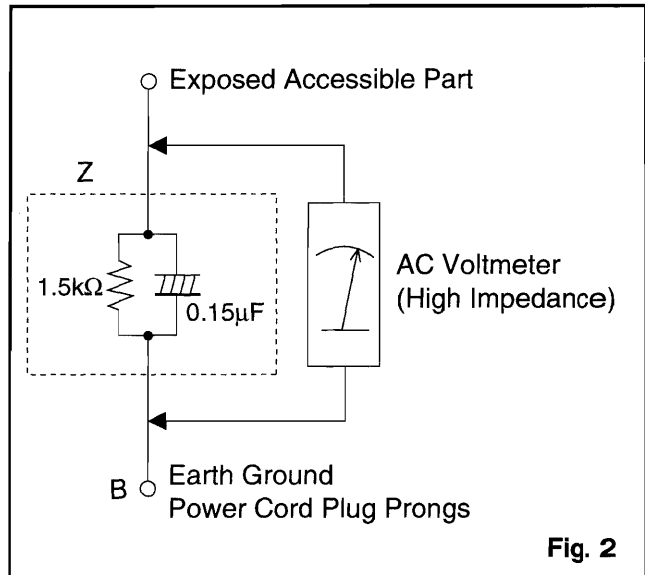
**Table 2 : Leakage current ratings for selected areas**

AC Line Voltage	Region	Load Z	Leakage Current (i)	Earth Ground (B) to:
110 to 130 V	USA	0.15 $\mu$ F CAP. & 1.5k $\Omega$ RES. connected in parallel	$i \leq 0.5$ mA rms	Exposed accessible parts

**Note:** This table is unofficial and for reference only. Be sure to confirm the precise values.



**Fig. 1**

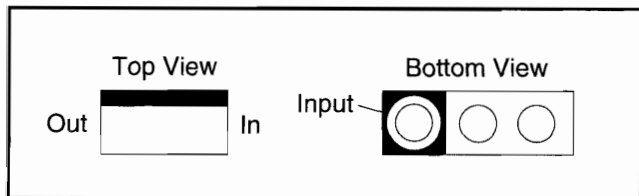


**Fig. 2**

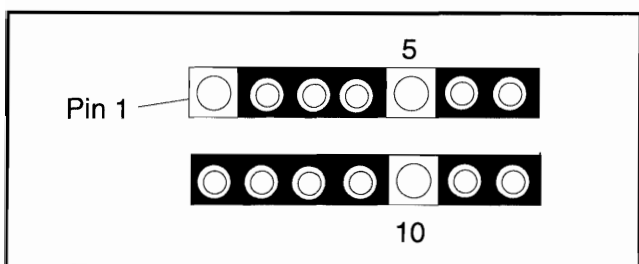
# STANDARD NOTES FOR SERVICING

## Circuit Board Indications

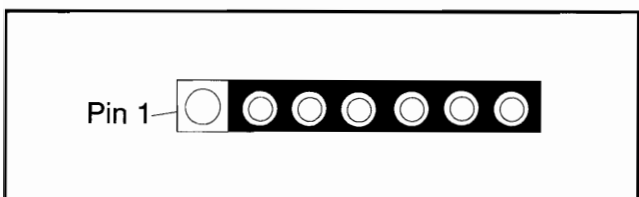
a. The output pin of the 3 pin Regulator ICs is indicated as shown.



b. For other ICs, pin 1 and every fifth pin are indicated as shown.



c. The 1st pin of every male connector is indicated as shown.

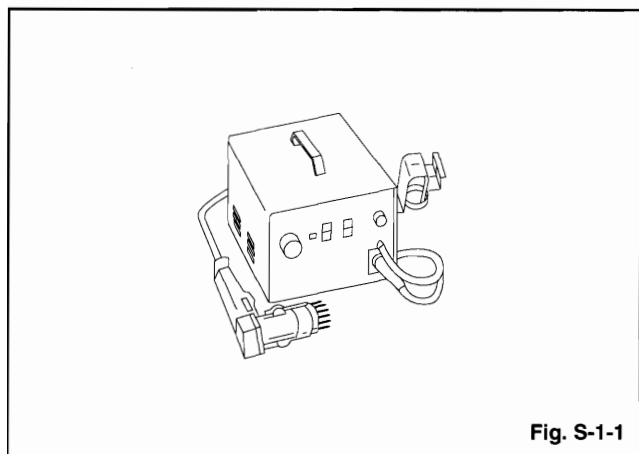


## How to Remove / Install Flat Pack-IC

### 1. Removal

**With Hot-Air Flat Pack-IC Desoldering Machine:**

(1) Prepare the hot-air flat pack-IC desoldering machine, then apply hot air to the Flat Pack-IC (about 5 to 6 seconds). (Fig. S-1-1)



(2) Remove the flat pack-IC with tweezers while applying the hot air.

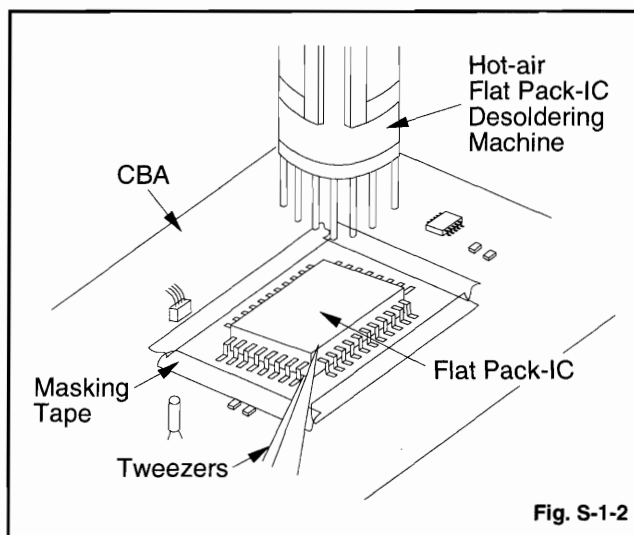
(3) Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)

(4) Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

### Caution:

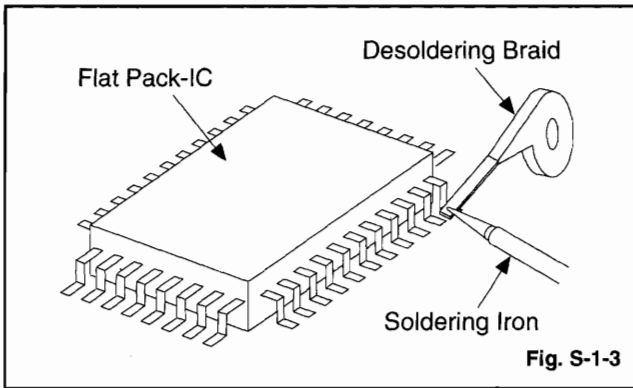
1. Do not supply hot air to the chip parts around the flat pack-IC for over 6 seconds because damage to the chip parts may occur. Put masking tape around the flat pack-IC to protect other parts from damage. (Fig. S-1-2)

2. The flat pack-IC on the CBA is affixed with glue, so be careful not to break or damage the foil of each pin or the solder lands under the IC when removing it.

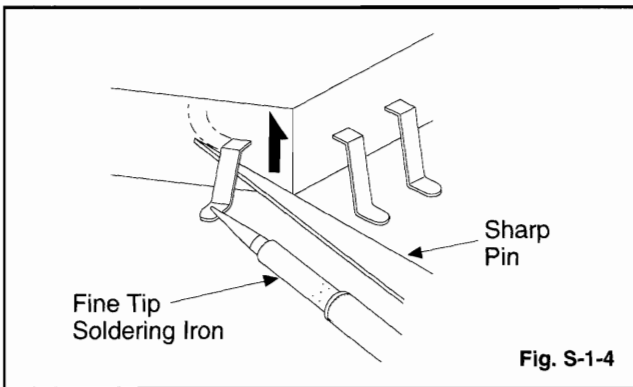


**With Soldering Iron:**

- (1) Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)



- (2) Lift each lead of the flat pack-IC upward one by one, using a sharp pin or wire to which solder will not adhere (iron wire). When heating the pins, use a fine tip soldering iron or a hot air desoldering machine. (Fig. S-1-4)



- (3) Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)
- (4) Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

**With Iron Wire:**

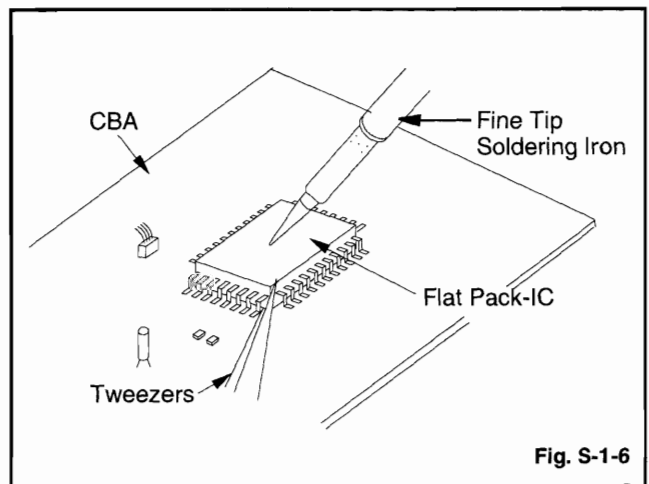
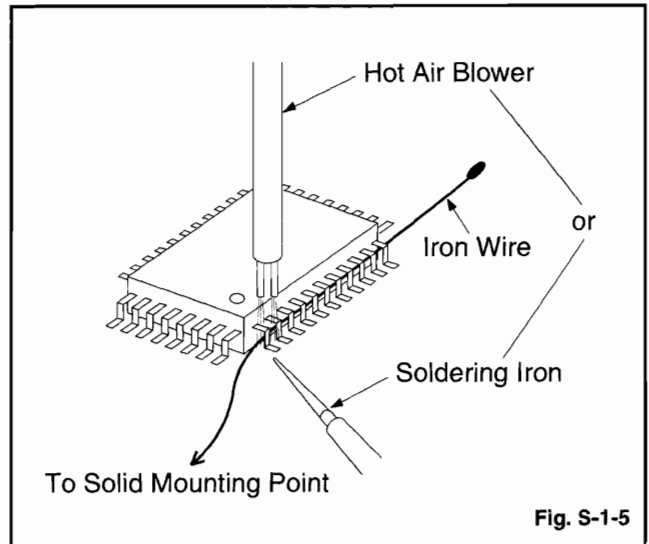
- (1) Using desoldering braid, remove the solder from all pins of the flat pack-IC. When you use solder flux which is applied to all pins of the flat pack-IC, you can remove it easily. (Fig. S-1-3)
- (2) Affix the wire to a workbench or solid mounting point, as shown in Fig. S-1-5.
- (3) While heating the pins using a fine tip soldering iron or hot air blower, pull up the wire as the solder melts so as to lift the IC leads from the CBA contact pads as shown in Fig. S-1-5.
- (4) Bottom of the flat pack-IC is fixed with glue to the CBA; when removing entire flat pack-IC, first apply

soldering iron to center of the flat pack-IC and heat up. Then remove (glue will be melted). (Fig. S-1-6)

- (5) Release the flat pack-IC from the CBA using tweezers. (Fig. S-1-6)

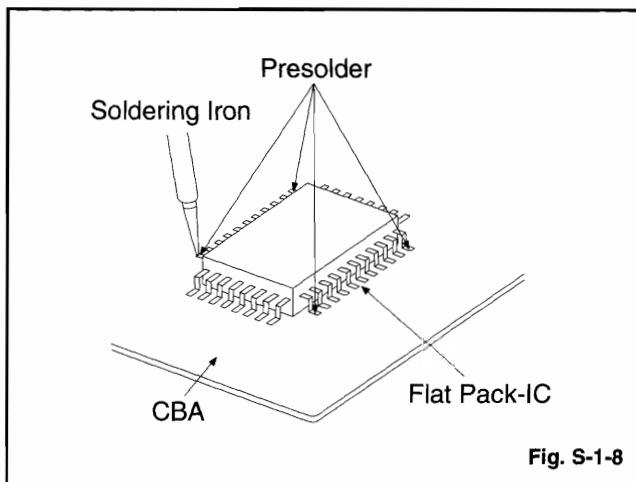
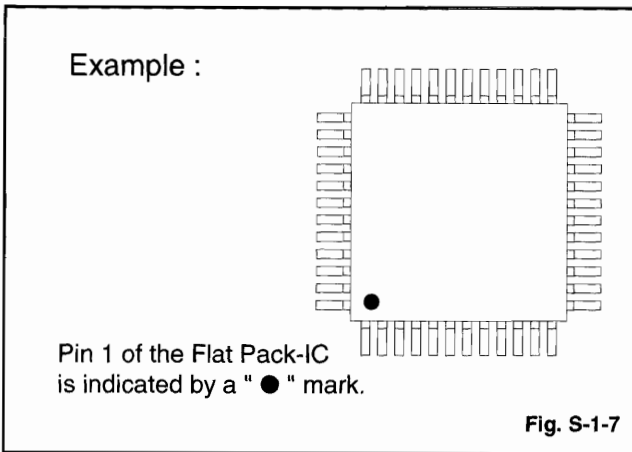
**Note:**

When using a soldering iron, care must be taken to ensure that the flat pack-IC is not being held by glue. When the flat pack-IC is removed from the CBA, handle it gently because it may be damaged if force is applied.



## 2. Installation

- (1) Using desoldering braid, remove the solder from the foil of each pin of the flat pack-IC on the CBA so you can install a replacement flat pack-IC more easily.
- (2) The "●" mark on the flat pack-IC indicates pin 1. (See Fig. S-1-7.) Be sure this mark matches the 1 on the PCB when positioning for installation. Then pre-solder the four corners of the flat pack-IC. (See Fig. S-1-8.)
- (3) Solder all pins of the flat pack-IC. Be sure that none of the pins have solder bridges.



## Instructions for Handling Semiconductors

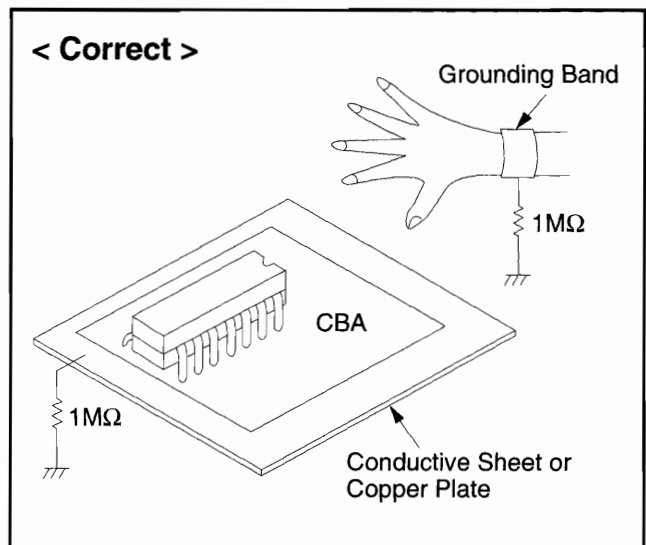
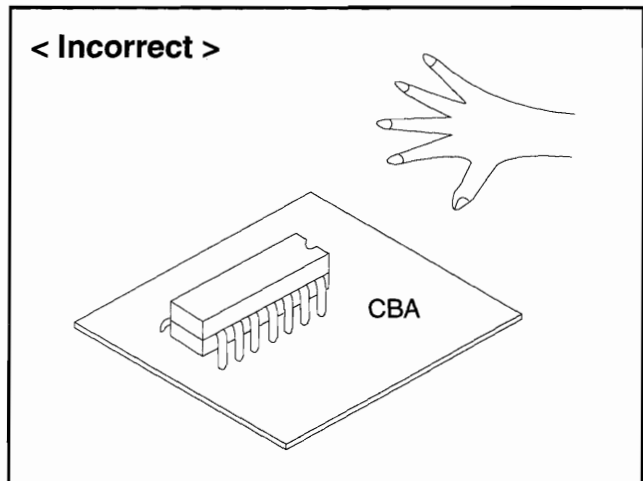
Electrostatic breakdown of the semiconductors may occur due to a potential difference caused by electrostatic charge during unpacking or repair work.

### 1. Ground for Human Body

Be sure to wear a grounding band ( $1M\Omega$ ) that is properly grounded to remove any static electricity that may be charged on the body.

### 2. Ground for Workbench

Be sure to place a conductive sheet or copper plate with proper grounding ( $1M\Omega$ ) on the workbench or other surface, where the semiconductors are to be placed. Because the static electricity charge on clothing will not escape through the body grounding band, be careful to avoid contacting semiconductors with your clothing.



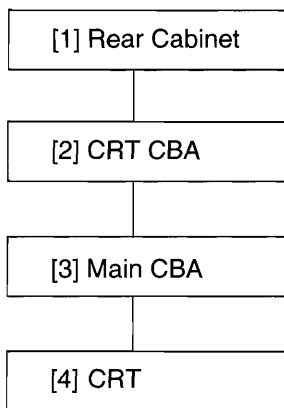
# CABINET DISASSEMBLY INSTRUCTIONS

## 1. Disassembly Flowchart

This flowchart indicates the disassembly steps for the cabinet parts, and the CBA in order to gain access to item(s) to be serviced. When reassembling, follow the steps in reverse order. Bend, route and dress the cables as they were.

### Caution !

When removing the CRT, be sure to discharge the Anode Lead of the CRT with the CRT Ground Wire before removing the Anode Cap.



## 2. Disassembly Method

Step/ Loc. No.	Part	Removal		
		Fig. No.	Remove/*unlock/ release/unplug/ unclamp/desolder	Note
[1]	Rear Cabinet	1,2	6(S-1)	1
[2]	CRT CBA	4,5	CN501	2
[3]	Main CBA	3,5	CN571	3
[4]	CRT	4	4(S-2), Anode Cap	4

↓            ↓            ↓            ↓            ↓  
 ①            ②            ③            ④            ⑤

### Note :

- ①. Order of steps in procedure. When reassembling, follow the steps in reverse order. These numbers are also used as the Identification (location) No. of parts in figures.
- ②. Parts to be removed or installed.
- ③. Fig. No. showing procedure of part location
- ④. Identification of part to be removed, unhooked, unlocked, released, unplugged, unclamped, or desoldered.  
S=Screw, P=Spring, L=Locking Tab, CN=Connector, \*=Unhook, Unlock, Release, Unplug, or Desolder  
2(S-2) = two Screws (S-2)
- ⑤. Refer to the following "Reference Notes in the Table."

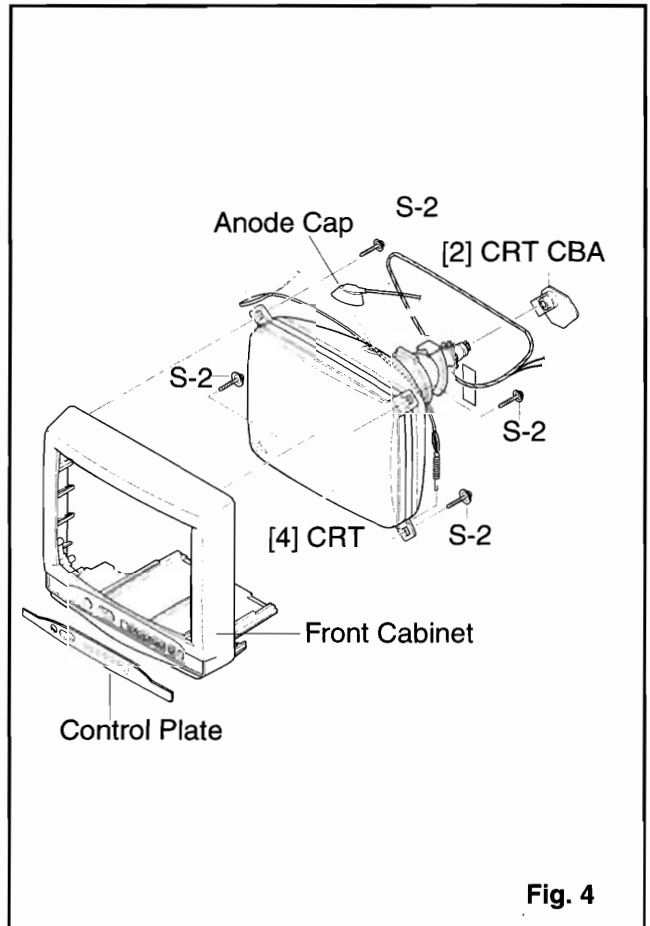
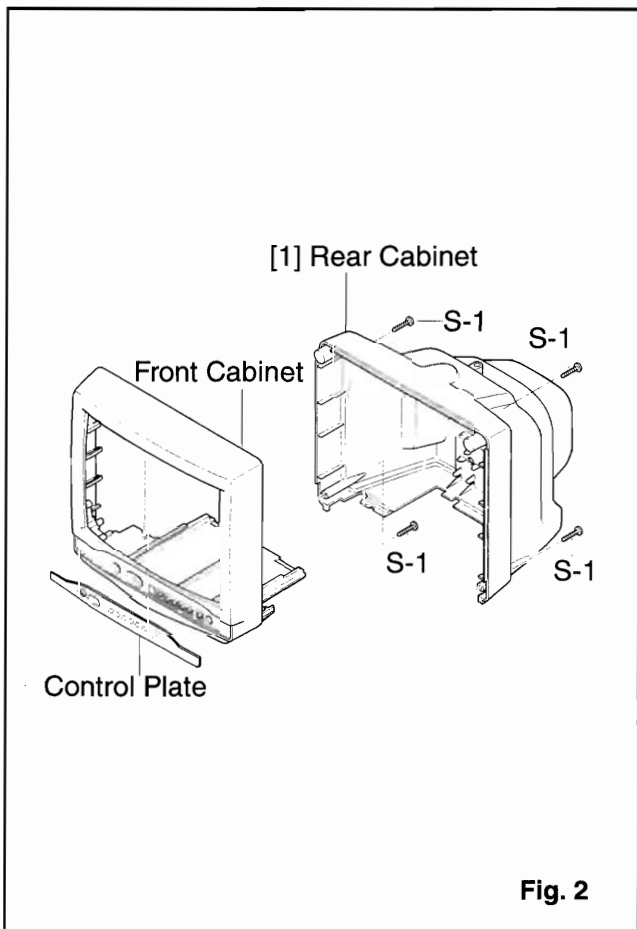
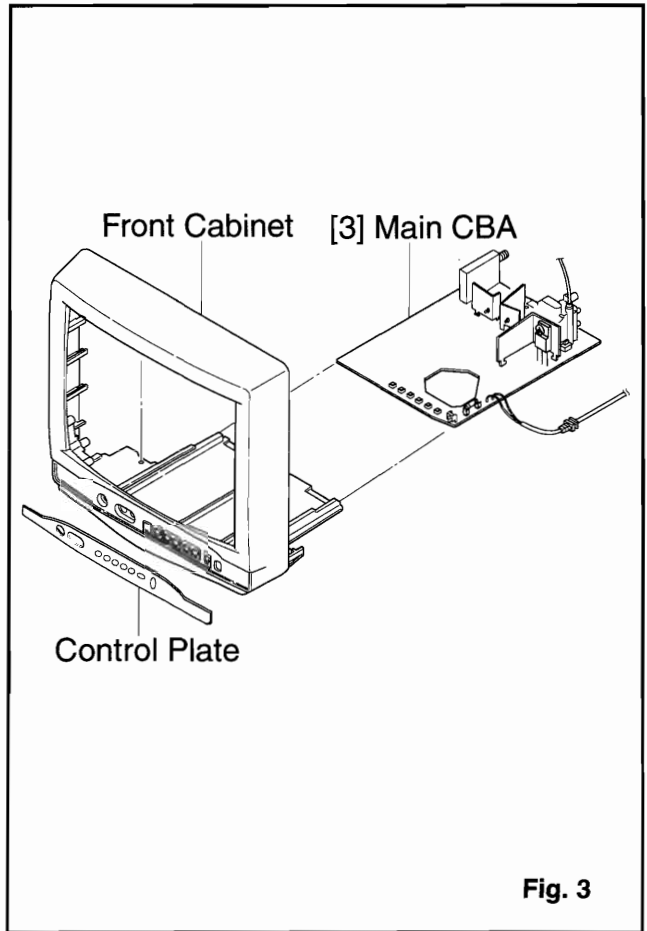
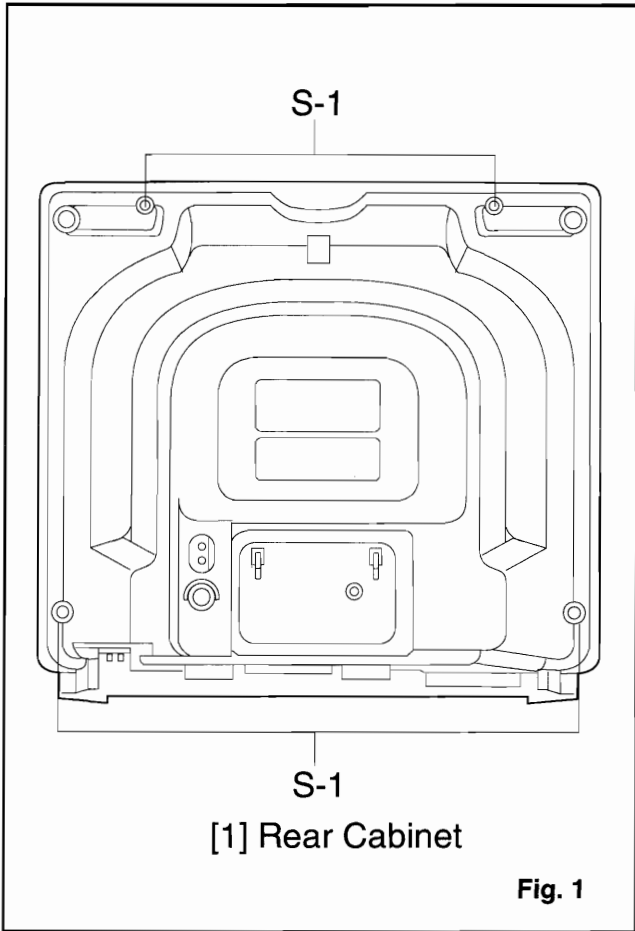
### Reference Notes in the Table

1. Removal of the Rear Cabinet. Remove screws 6(S-1) then slide the Rear Cabinet backward.
2. Removal of the CRT CBA. Disconnect CN501 then pull the CRT CBA backward.
3. Removal of the Main CBA. Disconnect CN571 on the Main CBA then slide the Main CBA backward.

### Caution !

Discharge the Anode Lead of the CRT with the CRT Ground Wire before removing the Anode Cap.

4. Removal of the CRT. Remove screws 4(S-2) and Anode Cap. then slide the CRT backward.





# TV Cable Wiring Diagram

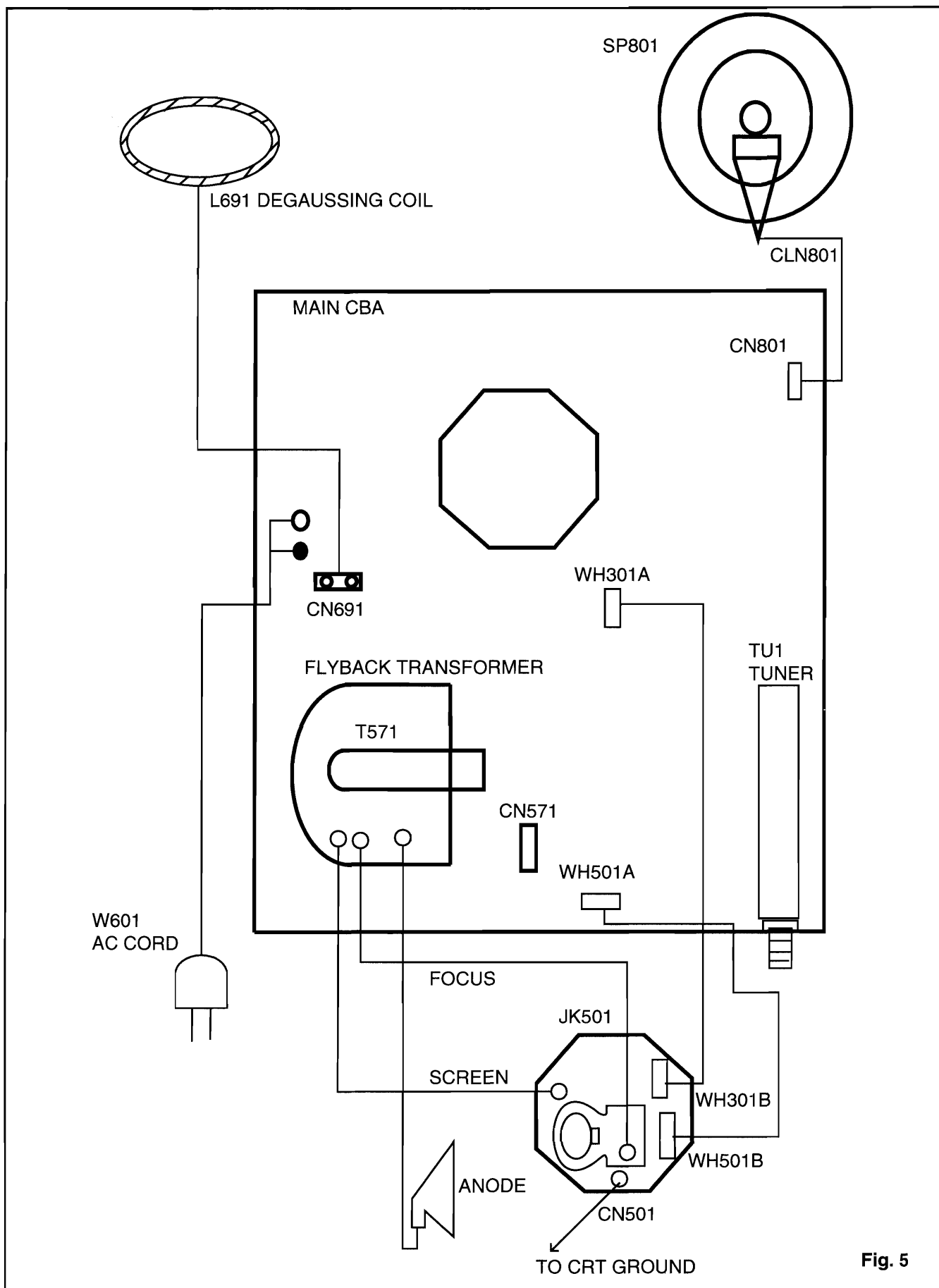


Fig. 5

# ELECTRICAL ADJUSTMENT INSTRUCTIONS

## General Note:

"CBA" is abbreviation for "Circuit Board Assembly".

## NOTE:

Electrical adjustments are required after replacing circuit components and certain mechanical parts.

It is important to perform these adjustments only after all repairs and replacements have been completed.

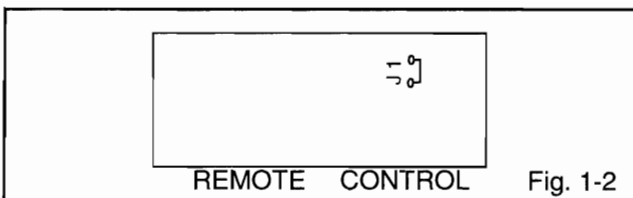
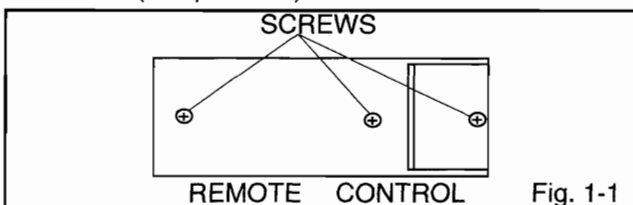
Also, do not attempt these adjustments unless the proper equipment is available.

## Test Equipment Required

1. NTSC Pattern Generator (Color Bar W/White Window, Red Color, Dot Pattern, Gray Scale, Monoscope, Multi-Burst)
2. DC Voltmeter
3. Oscilloscope: Dual-trace with 10:1 probe, V-Range: 0.001~50V/Div, F-Range: DC~AC-60MHz
4. Plastic Tip Driver
5. Remote control unit: Part No. N0105UD
6. DC power supply 13.2V/5A

## How to make Service remote control unit:

1. Prepare normal remote control unit. (Part No. N0105UD) Remove 3 Screws from the back lid. (Fig. 1-1)
2. Add J1 (Jumper Wire) to the remote control CBA.



(Fig. 1-2)

## How to set up the service mode:

### Service mode:

1. Use the service remote control unit.
2. Turn the power on. (Use main power on the TV unit.)

3. Press " SLEEP " button on the service remote control unit. (Version of micro computer will display on the CRT. (Ex: 174-0.10 or 175-0.17)

## 1. DC 105V Adjustment

**Purpose:** To obtain correct operation.

**Symptom of Misadjustment:** The picture is dark and the unit does not operate correctly.

Test Point	Adj. Point	Mode	Input
J305 (+114V) J300 (GND)	VR661	---	---
Tape	M. EQ.	Spec.	
---	DC Voltmeter	+114±0.5V DC.	

**Note:** J300, J305(GND), VR661 --- Main CBA

1. Connect DC Volt Meter to J305 and J300(GND).
2. Adjust VR661 so that the voltage of J305 becomes +105±0.5V DC.

## 2. Black Stretch Control Adjustment

**Purpose:** To show the fine black color.

**Symptom of Misadjustment:** Black color will not appear correctly.

**Note:** Use Service remote control unit.

1. Enter the Service mode. (See page 5-1)
2. Press " 6 " button on the Service remote control unit.
3. Press " CH ▲ / ▼ " buttons on the Service remote control unit so that display will change " OFF ", " 1 ", " 2 " and " 3 ". Then choose " OFF ".

**If the version of micro computer is 175-0.17 perform following steps as an additional adjustment.**

1. Enter the Service mode. (See page 5-1)
2. Press " 6 " button on the Service remote control unit.
3. Press " CH ▲ / ▼ " buttons on the Service remote control unit so that display will change " B-S\*1 ", " B-S\*2 ". Select " B-S\*2 " and choose " 0 ".
4. Turn the power off and on again. (Main power button on the TV unit.)

## 3-1. Setting for OSD D/A, V-TINT, 9V and STEREO data Values

**If the version of micro computer is " 174-0.10 " perform the following steps below.**

### General

1. Enter the Service mode. (See page 5-1)

2. Press " VOL ▲ " button on the Service remote control unit. Display changes " OSD D/A ", " C/D ", " V-TINT ", " VCO ", " 9V " and " STEREO " cyclically when " VOL ▲ " button is pressed.

#### OSD D/A

1. Press " VOL ▲ " button on the Service remote control unit. Then select OSD D/A display.
2. Press " CH ▲ / ▼ " buttons on the Service remote control unit. Then choose OSD D/A=ANA.

#### V-TINT

1. Press " VOL ▲ " button on the Service remote control unit. Then select V-TINT display.
2. Press " CH ▲ / ▼ " buttons on the Service remote control so that the value of V-TINT becomes 63.

#### 9V

1. Press " VOL ▲ " button on the Service remote control unit. Then select 9V display.
2. Press " CH ▲ / ▼ " buttons on the Service remote control unit. Then choose 9V=OFF.

#### STEREO

1. Press " VOL ▲ " button on the Service remote control unit. Then select STEREO display.
2. Press " CH ▲ / ▼ " buttons on the Service remote control unit. Then choose STEREO=OFF.

**Note:** There is no need to adjust **C/D** and **VCO** data values at this moment.

### 3-2. Setting for OSD D/A, AFC 2, 9V and STEREO data Values

If the version of micro computer is " 175-0.17 " perform the following steps.

#### General

1. Enter the Service mode. (See page 5-1)
2. Press " VOL ▲ " button on the Service remote control unit. Display changes " OSD D/A ", " C/D ", " AFC 2 ", " VCO ", " 9V " and " STEREO " cyclically when " VOL ▲ " button is pressed.

#### OSD D/A

1. Press " VOL ▲ " button on the Service remote control unit. Then select OSD D/A display.
2. Press " CH ▲ / ▼ " buttons on the Service remote control unit. Then choose OSD D/A=ANA.

#### AFC 2

1. Press " VOL ▲ " button on the Service remote control unit. Then select AFC 2 display.
2. Press " CH ▲ / ▼ " buttons on the Service remote control. Then choose AFC 2 = " NOR ".

#### 9V

1. Press " VOL ▲ " button on the Service remote control unit. Then select 9V display.

2. Press " CH ▲ / ▼ " buttons on the Service remote control unit. Then choose 9V=OFF.

#### STEREO

1. Press " VOL ▲ " button on the Service remote control unit. Then select STEREO display.
2. Press " CH ▲ / ▼ " buttons on the Service remote control unit. Then choose STEREO=OFF.

**Note:** There is no need to adjust **C/D** and **VCO** data values at this moment.

### 3-3. Setting for CONTRAST, COLOR and TINT data Values

#### General

1. Enter the Service mode. (See page 5 -1)
2. Press " MENU " button on the Service remote control unit. Display changes " BRIGHT ", " CONTRAST ", " COLOR " and " TINT " cyclically when " MENU " button is pressed.

#### CONTRAST (CNT)

1. Press " MENU " button on the Service remote control unit. Then select " CONTRAST " (CNT) display.
2. Press " CH ▲ / ▼ " buttons on the Service remote control unit so that the value of " CONTRAST " (CNT) becomes 92.

#### COLOR (CLR)

1. Press " MENU " button on the Service remote control unit. Then select " COLOR " (CLR) display.
2. Press " CH ▲ / ▼ " buttons on the Service remote control unit so that the value of " COLOR " (CLR) becomes 58.

#### TINT (TNT)

1. Press " MENU " button on the Service remote control unit. Then select " TINT " (TNT) display.
2. Press " CH ▲ / ▼ " buttons on the Service remote control unit so that the value of " TINT " (TNT) becomes 57.

**The following 2 adjustments are only required if the version of micro computer is 175-0.17.**

#### V-TINT (V-TNT)

1. Press " MENU " button on the Service remote control unit. Then select " V-TINT " (V-TNT) display.
2. Press " CH ▲ / ▼ " buttons on the Service remote control unit so that the value of " V-TINT " (V-TNT) becomes 57.

#### SHARP (SHARP)

1. Press " MENU " button on the Service remote control unit. Then select " SHARP " (SHARP) display.
2. Press " CH ▲ / ▼ " buttons on the Service remote control unit and select " SHARP ON ".

**Note:** There is no need to adjust **BRIGHT** data value at this moment.

## 4. H f<sub>0</sub> Adjustment

**Purpose:** To get correct horizontal frequency.

**Symptom of Misadjustment:** If H f<sub>0</sub> adjustment is in correct, sqew distortion will appear on the screen.

Test Point	Adj. Point	Mode	Input
J303	CH ▲ / ▼ button ["H-ADJ"] MODE		----
Tape	M. EQ.	Spec.	
----	Frequency Counter	15.734 kHz±300Hz	

**Note:** J303 --- Main CBA

Use Service remote control unit.

1. Connect Frequency Counter to J303 and ground.
2. Set the unit to the VIDEO mode which is located before CH2 and no input is necessary. Enter the Service mode. (See Page 5-1)
3. Operate the unit for at least 20 minutes.
4. Press " 2 " button on the Service remote control unit and select H-ADJ Mode. (By pressing " 2 " button the display will change from TV AGC to H-ADJ)
5. Press " CH ▲ / ▼ " button on the Service remote control unit so that the display will change " 0 " ~ " 7 ". At this moment, Choose the display from " 0 " ~ " 7 " when the Frequency Counter shows 15.734kHz±300Hz or closer.
6. Turn the power off and on again. (Main Power button on the TV unit.)

## 5. VCO Adjustment

**Purpose:** To operate VCO correctly.

**Symptom of Misadjustment:** VCO does not work correctly and/or synchronization is faulty.

Test Point	Adj. Point	Mode	Input
---	---		No signal
Tape	M. EQ.	Spec.	
---	---	Green display	

**Note:** Use service remote control unit.

1. Disconnect the RF input and set the unit to Channel 4.
2. Enter the Service mode. (See Page 5-1)
3. Press " 3 " button on the Service remote control unit. The Auto VCO adjustment is started.
4. If the display color is changed from red to green, this adjustment is done.

5. Turn the Power off and on again. (Main power button on the TV unit.)

## 6. AGC Adjustment

**Purpose:** Set AGC (Auto Gain Control) Level.

**Symptom of Misadjustment:** AGC does not synchronize correctly when RF input level is too weak and picture distortion may occur if it is too strong.

Test Point	Adj. Point	Mode	Input
J302	CH ▲ / ▼ buttons	RF	Color Bar 67.25MHz 60dBμV
Tape	M. EQ.	Spec.	
---	Pattern Generator DC Volt Meter	+2.3±0.1VDC or +2.5±0.1VDC by Tuner Type.	

**Note:** J302 --- Main CBA

Use Service remote control unit.

1. Enter the Service mode. (See Page 5-1) Then press number " 2 " button on the Service remote control unit.
2. Receive the Color Bar signal for channel 4 (67.25MHz). (RF Input Level: 60dBμV)
3. If the tuner type number is TEDH9X203A, press the " CH ▲ / ▼ " buttons so that the voltage of J302 becomes +2.3±0.1V DC.
4. If the tuner type number is B8055AR, press the " CH ▲ / ▼ " buttons so that the voltage of J302 becomes +2.5±0.1V DC.
5. Turn the Power off and on again. (Main power button on the TV unit.)

## 7. Black Level Adjustment

**Purpose:** Set Sub-bright Level

**Symptom of Misadjustment:** If Sub-brightness is incorrect, Proper brightness can not be obtained by adjusting the Brightness Control.

**Note:** J502, J501 (GND) --- CRT CBA

1. Enter the Service mode. (See page 5-1).
2. Press " MENU " button on the Service remote control unit and select " BRT " mode. (Display changes " BRT ", " CNT ", " CLR " and " TNT " cyclically when MENU button is pressed).
3. Press " CH ▲ / ▼ " buttons on the Service remote control unit so that the value of " BRT " becomes 128.
4. Turn the power off and on again. (Main power button on the TV unit.)

## 8. C-Trap Adjustment

**Purpose:** To get minimum leakage of the color signal carrier.

**Symptom of Misadjustment:** If C- Trap Adjustment is incorrect, stripes will appears on the screen.

Test Point	Adj. Point	Mode	Input
J502 (Blue) J501 (GND)	CH ▲ / ▼ buttons	RF	Color Bar
<b>Tape</b>	<b>M. EQ.</b>	<b>Spec.</b>	
----	Oscilloscope	----	

**Note:** J502, J501 --- CRT CBA

Use Service remote control unit.

1. Connect Oscilloscope to J502 and J501 (GND) .
2. Enter the Service mode. (See Page 5-1) Receive color bar signal from RF Input.
3. Press " 0 " button on the Service remote control unit and select C-TRP Mode.
4. Press " CH ▲ / ▼ " buttons on the Service remote control unit so that the display will change " 0 ", " 1 ", " 2 " and " 3 ". Choose display " 0 ", " 1 ", " 2 " or " 3 " when B-Out (3.58MHz) value becomes minimum on the oscilloscope reading.
5. Turn the power off and on again. (Main power button on the TV unit.)

## 9. V. Size Adjustment

**Purpose:** To obtain correct vertical width of screen image.

**Symptom of Misadjustment:** If V. Size is incorrect, vertical size of image on the screen may not be properly displayed.

Test Point	Adj. Point	Mode	Input
---	Screen Control CH ▲ / ▼ buttons [ V-S ] Mode	RF	Monoscope
<b>Tape</b>	<b>M. EQ.</b>	<b>Spec.</b>	
---	Pattern Generator	90±5%	

**Note:** Use service remote control unit.

1. Operate the unit for at least 20 minutes.
2. Enter the Service mode. (See page 5-1)
3. Receive the Monoscope Pattern.
4. Press " 9 " button on the Service remote control unit and select " V-S " mode. (Display changes " V-S " and " V-P " cyclically when " 9 " button is pressed).
5. Press " CH ▲ / ▼ " buttons on the Service remote control unit so that the monoscope pattern becomes 90±5% of display size and the circle is round.
6. Turn the power off and on again. (Main power button on the TV unit.)

## 10. V. Position Adjustment

**Purpose:** To obtain correct vertical height of screen image.

**Symptom of misadjustment:** If V. Position is incorrect, vertical height of image on the screen may not be properly displayed.

Test Point	Adj. Point	Mode	Input
---	Screen Control CH ▲ / ▼ buttons [ V-P ] Mode	RF	Monoscope
<b>Tape</b>	<b>M. EQ.</b>	<b>Spec.</b>	
---	Pattern Generator	90±5%	

**Note:** Use Service remote control unit

1. Operate the unit for at least 20 minutes.
2. Enter the Service Mode. (See page 5-1)
3. Receive the Monoscope Pattern.
4. Press " 9 " button on the Service remote control unit and select " V-P " mode. (Display change " V-S " and " V-P " cyclically when " 9 " button is pressed).
5. Press " CH ▲ / ▼ " buttons on the Service remote control unit so that the top and bottom of the monoscope pattern become equal to each other.
6. Turn the Power off and on again. (Main power button on the TV unit.)

## 11. H. Position Adjustment

**Purpose:** To obtain correct horizontal position of screen image.

**Symptom of Misadjustment:** If H. Position is incorrect, horizontal position of image on the screen may not be properly displayed.

Test Point	Adj. Point	Mode	Input
---	Screen Control CH ▲ / ▼ buttons [ H-P ] Mode	RF	Monoscope
<b>Tape</b>	<b>M. EQ.</b>	<b>Spec.</b>	
---	Pattern Generator	90±5%	

**Note:** Use Service remote control unit

1. Operate the unit for at least 20 minutes.
2. Enter the Service mode. (See page 5-1)
3. Receive the Monoscope Pattern.
4. Press " 8 " button on the remote control unit and select " H-P " mode.
5. Press " CH ▲ / ▼ " buttons on the Service remote control unit so that the monoscope pattern becomes 90±5% of display size and the circle is round.
6. Turn the power off and on again. (Main power button on the TV unit.)

## 12. Cut-off Adjustment

**Purpose:** To adjust the beam current of R, G, B, and screen voltage.

**Symptom of Misadjustment:** White color may be reddish, greenish or bluish.

Test Point	Adj. Point	Mode	Input
---	Screen-Control CH ▲ / ▼ buttons	RF	Black Raster
Tape	M. EQ.	Spec.	
---	Pattern Generator	See Reference Notes below.	

Figure

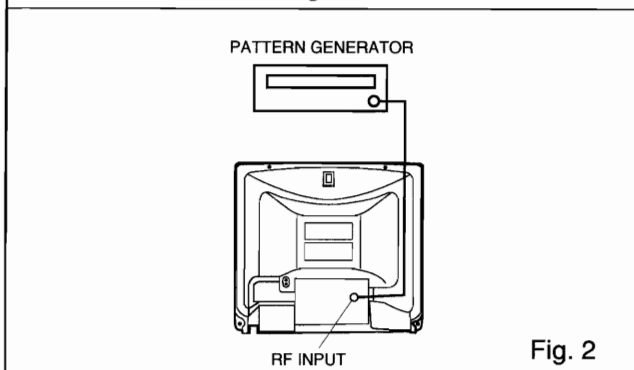


Fig. 2

**Note:** Screen Control FBT --- Main CBA

F.B.T= Fly Back Transformer

Use Service remote control unit

1. Degauss the CRT and allow CRT to operate for 20 minutes before starting the alignment.
2. Input the Black Raster Signal from RF Input.
3. Enter the Service mode. (See page 5-1)
4. Press " VOL ▲ " button on the Service remote control unit and select " C/D " mode. (Display changes " OSD D/A ", " C/D ", " V-TINT ", " VCO ", " 9V " and " STEREO " cyclically when " VOL ▲ " button is pressed.) then press " 1 ". The display will momentarily show " CUT OFF R " (R= Red). Now there should be a horizontal line across the center of the picture tube. If needed gradually turn the screen control on the flyback, clockwise until the horizontal line appears. Adjust the Red Cut off by pressing the " CH ▲ / ▼ " buttons. Proceed to Step 5 when the Red Cut off adjustment is done.
5. Press the " 2 " button. The display will momentarily show " CUT OFF G " (G=Green). Adjust the Green Cut off by pressing the " CH ▲ / ▼ " buttons. Proceed to step 6 when the Green Cut off adjustment is done.
6. Press the " 3 " button. The display will momentarily show " CUT OFF B " (B=Blue). Adjust the Blue cut off by pressing the " CH ▲ / ▼ " buttons. When done with steps 4, 5 and 6 the horizontal line should be pure white. If not, then attempt the Cut off adjustment again.

## 13. White Balance Adjustment

**Purpose:** To mix red, green and blue beams correctly for pure white.

**Symptom of Misadjustment:** White becomes bluish or reddish.

Test Point	Adj. Point	Mode	Input
Screen	CH ▲ / ▼ buttons	RF	White Raster (APL 100%)
Tape	M. EQ.	Spec.	
	Pattern Generator, Color analyzer	See below	

Figure

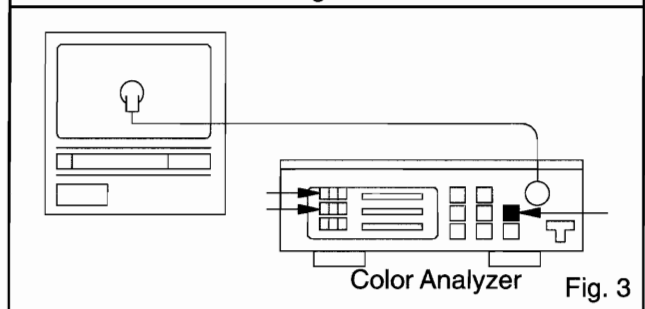


Fig. 3

**Note:** Use Service remote control unit

1. Operate the unit more than 20 minutes.
  2. Face the unit to east. Degauss the CRT using De-gaussing Coil.
  3. Input the White Raster (APL 100%).
  4. Set the color analyzer to the CHROMA mode and after zero point calibration, bring the optical receptor to the center on the tube surface (CRT).
  5. Enter the Service mode . Press " VOL ▲ " button on the Service remote control unit and select " C/D " mode. (Display changes " OSD D/A ", " C/D ", " V-TINT ", " VCO ", " 9V " and " STEREO " cyclically when " VOL ▲ " button is pressed.) then Press No. 8 button on the Service remote control Unit.
  6. Press No. 4 button on the service remote control unit for Red adjustment. Press No. 5 button on the Service remote control unit for Blue adjustment.
  7. In each color mode, Press " CH ▲ / ▼ " button to adjust the values of color.
  8. Adjusting Red and Blue color so that the temperature becomes  $9200^{\circ}\text{K}$  (x : 286 / y : 294)  $\pm 3\%$ .
  9. At this time, Re-check that Horizontal line is white. If not, Re-adjust Cut-off Adjustment until the Horizontal Line becomes pure white.
  10. Turn off and on again to return to normal mode. Receive APL 100% white signal and Check Chroma temperature become  $9200^{\circ}\text{K}$  (x : 286 / y : 294)  $\pm 3\%$ .
- Note:** Confirm that Cut Off Adj. is correct after this adjustment, and attempt Cut Off Adj. if needed.

## 14. Sub-Brightness Adjustment

**Purpose:** To get proper brightness.

**Symptom of Misadjustment:** If Sub-Brightness is incorrect, proper brightness cannot be obtained by adjusting the Brightness Control.

Test Point	Adj. Point	Mode	Input
---	CH ▲ / ▼ buttons	RF	IQW
Tape	M. EQ.	Spec.	
---	Pattern Generator	See below	
Figure			

**Note:** IQW Setup level --- 7.5 IRE  
Use Service remote control unit

1. Enter the Service mode. (See page 5-1)  
Then input IQW signal from RF Input.
2. Press "MENU" button on the Service remote control unit and Select "BRT" mode. (Display changes "BRT", "CNT", "CLR", and "TNT" cyclically when MENU button is pressed). Press "CH ▲ / ▼" buttons so that the bar is just visible (See above figure).
3. Turn the power off and on again. (Main power button on the TV unit.)

## 15. Focus Adjustment

**Purpose:** Set the optimum Focus.

**Symptom of Misadjustment:** If Focus Adjustment is incorrect, blurred images are shown on the display.

Test Point	Adj. Point	Mode	Input
---	Focus Control	---	Monoscope
Tape	M. EQ.	Spec.	
---	Pattern Generator	See below.	

**Note:** Focus VR(FBT)—MainCBA FBT=FlyBack Transformer

1. Operate the unit more than 30 minutes
2. Face the unit to the East and degauss the CRT using a Degaussing Coil.
3. Input the Monoscope Pattern.
4. Adjust the Focus Control on the FBT to obtain a clear picture.

The following 2 adjustments normally are not attempted in the field. They should be done only when replacing the CRT then adjust as a preparation.

## 16. Purity Adjustment

**Purpose:** To obtain pure color.

**Symptom of Misadjustment:** If Color Purity Adjustment is incorrect, large areas of color may not be properly displayed.

Test Point	Adj. Point	Mode	Input
---	Deflection Yoke Purity Magnet	---	Red Color
Tape	M. EQ.	Spec.	
---	Pattern Generator	See below.	
Figure			

1. Set the unit facing east.
2. Operate the unit for over 30 minutes before adjusting.
3. Fully degauss the unit using an external degaussing coil.
4. Loosen the screw on the Deflection Yoke Clamper and pull the Deflection Yoke back away from the screen. (See Fig. 6)
5. Loosen the Ring Lock and adjust the Purity Magnets so that a red field is obtained at the center of the screen. Tighten Ring Lock. (See Fig. 5,6)
6. Slowly push the Deflection Yoke toward bell of CRT and set it where a uniform red field is obtained.
7. Tighten the clamp screw on the Deflection Yoke.

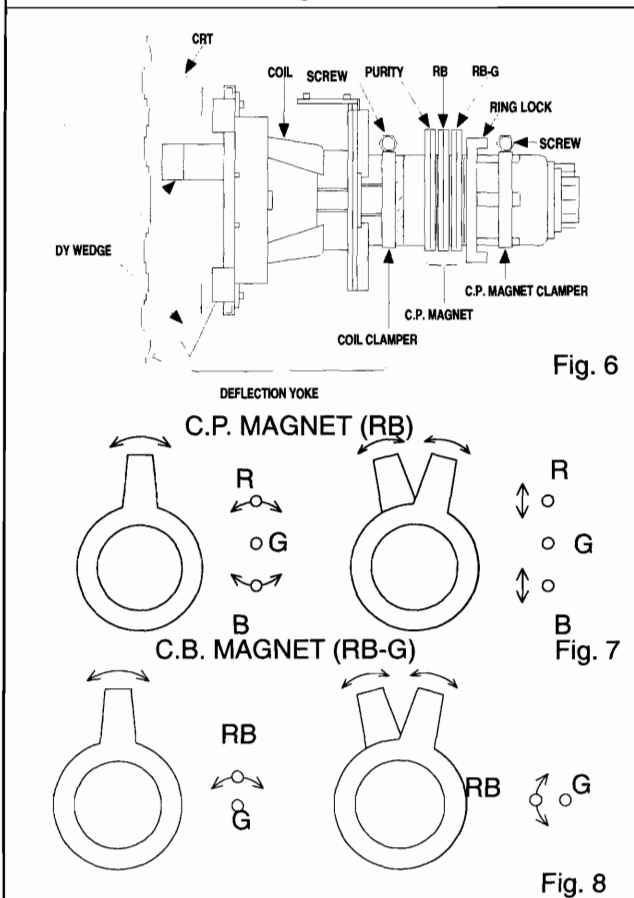
## 17. Convergence Adjustment

**Purpose:** To obtain proper convergence of red, green and blue beams.

**Symptom of Misadjustment:** If Convergence Adjustment is incorrect, the edge of white letters may have color edges.

Test Point	Adj. Point	Mode	Input
---	C.P. Magnet (RB), C.P. Magnet (RB-G), Deflection Yoke	---	Dot Pattern or Crosshatch
Tape	M. EQ.	Spec.	
---	Pattern Generator	See below.	

Figures

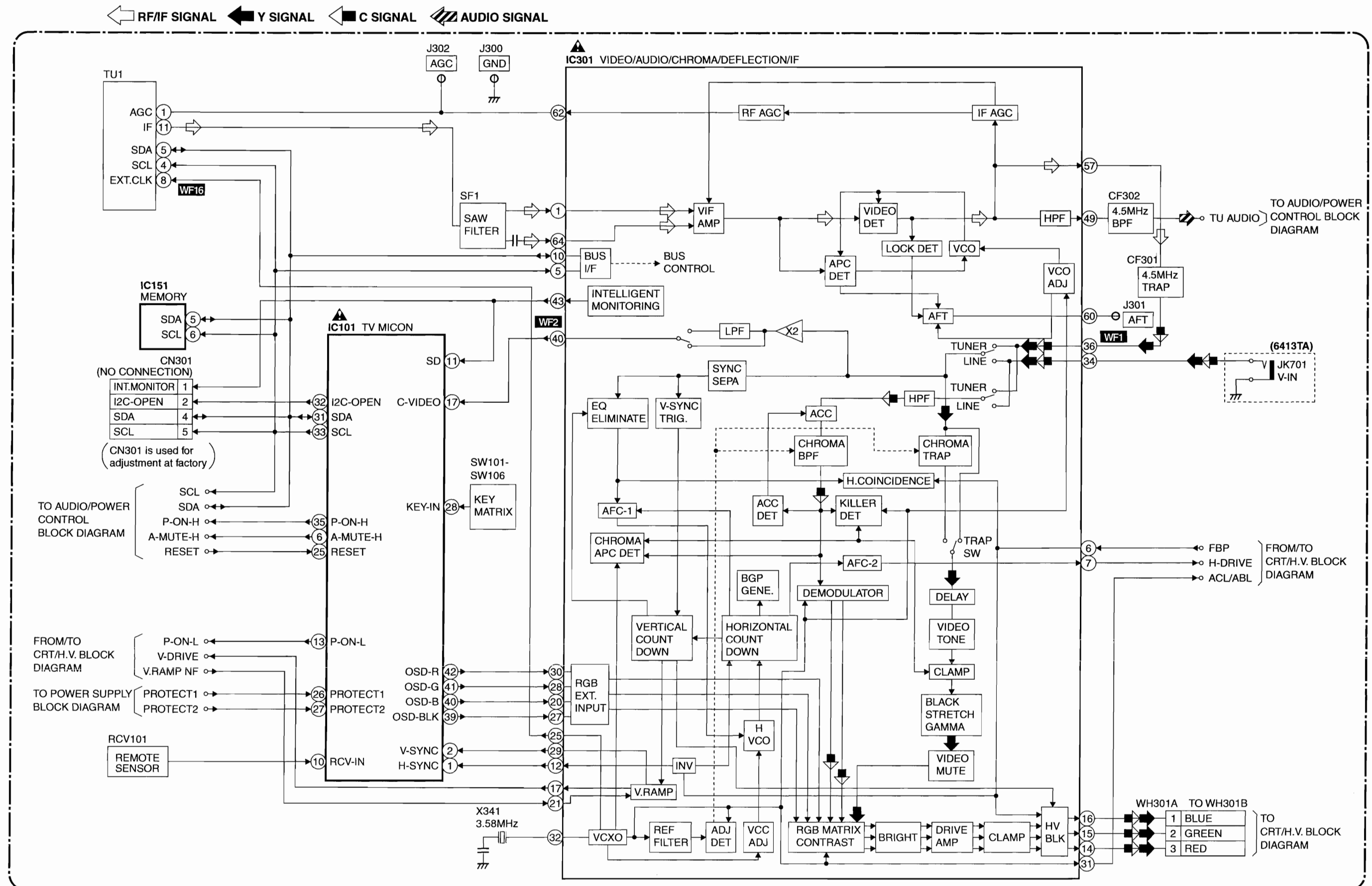


1. Loosen the Ring Lock and align red with blue dots or Crosshatch at the center of the screen by rotating (RB) C.P. Magnets. (See Fig. 7)
2. Align red / blue with green dots at the center of the screen by rotating (RB-G) C.P. Magnet. (See Fig. 8)
3. Fix the C.P. Magnets by tightening the Ring Lock.
4. Remove the DY Wedges and slightly tilt the Deflection Yoke horizontally and vertically to obtain the best overall convergence.
5. Fix the Deflection Yoke by carefully inserting the DY Wedges between CRT and Deflection Yoke.



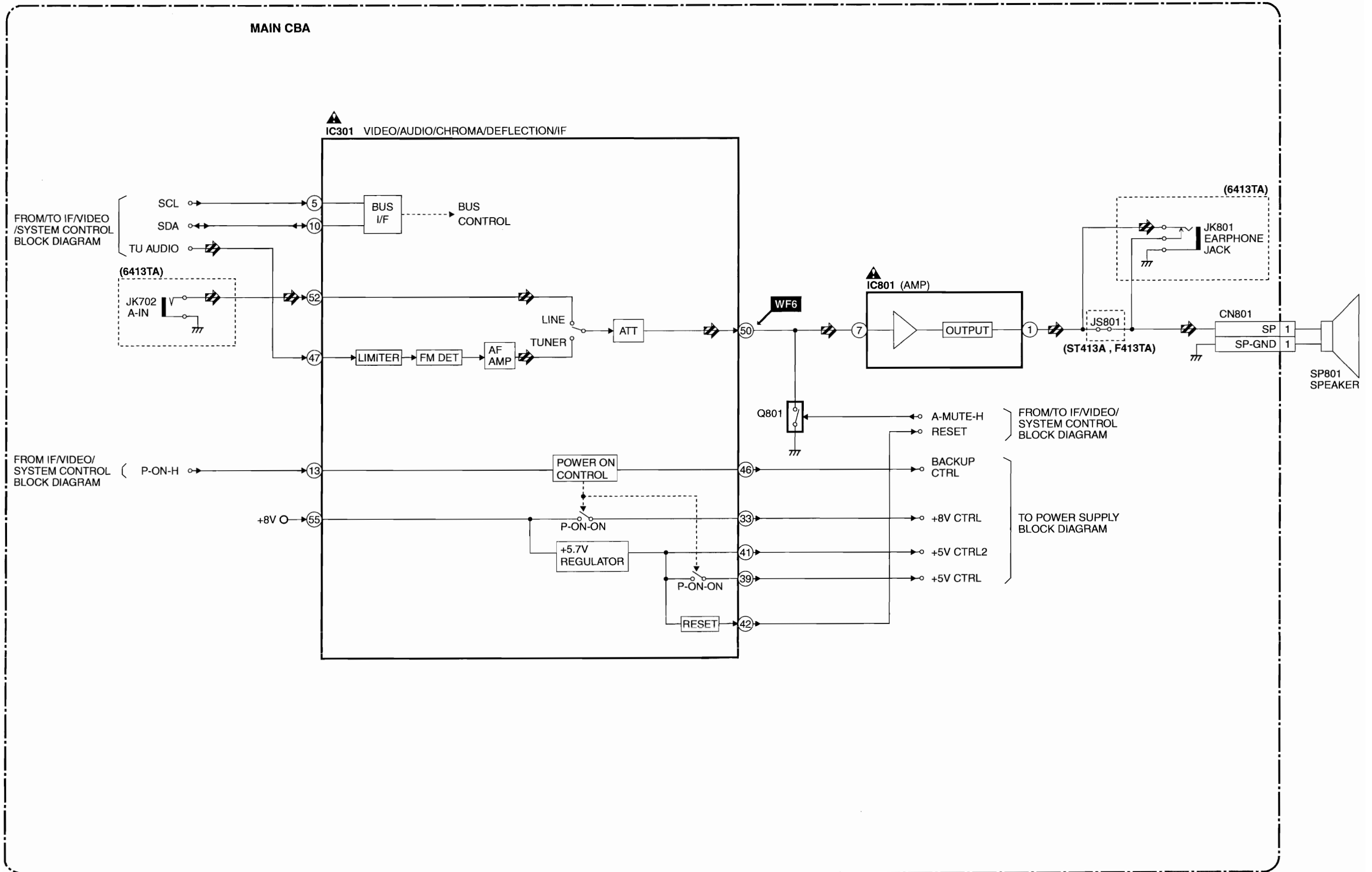
# BLOCK DIAGRAMS

## IF/Video/System Control Block Diagram



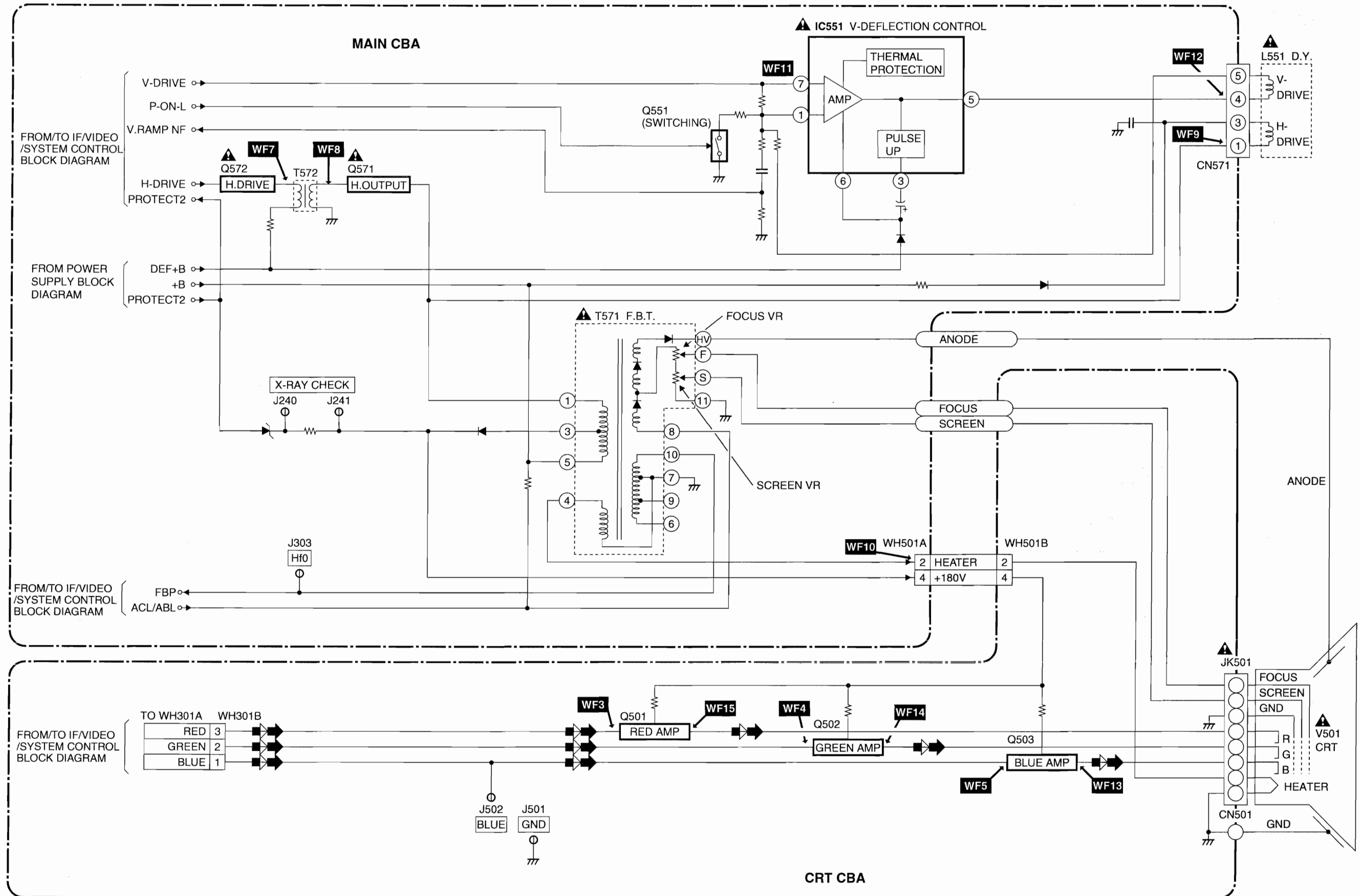
# Audio/Power Control Block Diagram

**AUDIO SIGNAL**



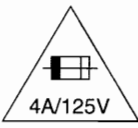
# CRT/H.V. Block Diagram

← Y SIGNAL   ← C SIGNAL



# Power Supply Block Diagram

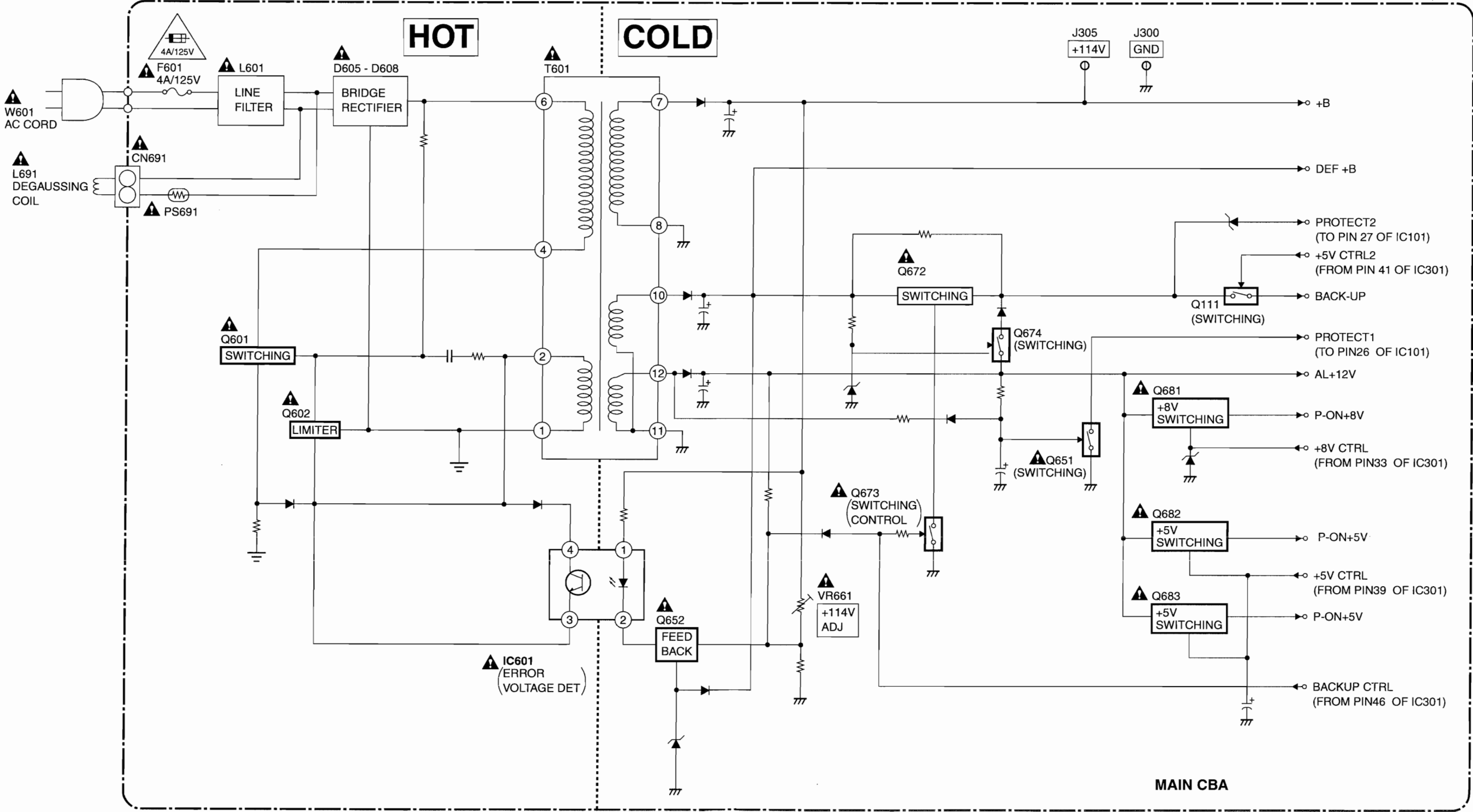
**CAUTION !**  
 Fixed voltage power supply circuit is used in this unit.  
 If Main Fuse (F601) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.  
 Otherwise it may cause some components in the power supply circuit to fail.



**CAUTION**  
 FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,  
 REPLACE ONLY WITH THE SAME TYPE FUSE.  
 ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES  
 D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.  
**RISK OF FIRE-REPLACE FUSE AS MARKED.**

"This symbol means fast operating fuse."  
 "Ce symbole représente un fusible à fusion rapide."

**NOTE :**  
 The voltage for parts in hot circuit is measured using  
 hot GND as a common terminal.



# SCHEMATIC DIAGRAMS / CBA'S AND TEST POINTS

## Standard Notes

Many electrical and mechanical parts in this chassis have special characteristics. These characteristics often pass unnoticed and the protection afforded by them cannot necessarily be obtained by using replacement components rated for higher voltage, wattage, etc. Replacement parts that have these special safety characteristics are identified in this manual and its supplements; electrical components having such features are identified by the mark "▲" in the schematic diagram and the parts list. Before replacing any of these components, read the parts list in this manual carefully. The use of substitute replacement parts that do not have the same safety characteristics as specified in the parts list may create shock, fire, or other hazards.

### Note:

1. Do not use the part number shown on these drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since these drawings were prepared.
2. All resistance values are indicated in ohms ( $K=10^3$ ,  $M=10^6$ ).
3. Resistor wattages are 1/4W or 1/6W unless otherwise specified.
4. All capacitance values are indicated in  $\mu F$  ( $P=10^{-6}\mu F$ ).
5. All voltages are DC voltages unless otherwise specified.

### Note of Capacitors:

ML --- Mylar Cap.    PP --- Metalized Film Cap.    SC --- Semiconductor Cap.    L --- Low Leakage type

### Temperature Characteristics of Capacitors are noted with the following:

B ---  $\pm 10\%$     CH ---  $0 \pm 60 \text{ ppm}/^\circ\text{C}$     SL ---  $+350 \sim -1000 \text{ ppm}/^\circ\text{C}$

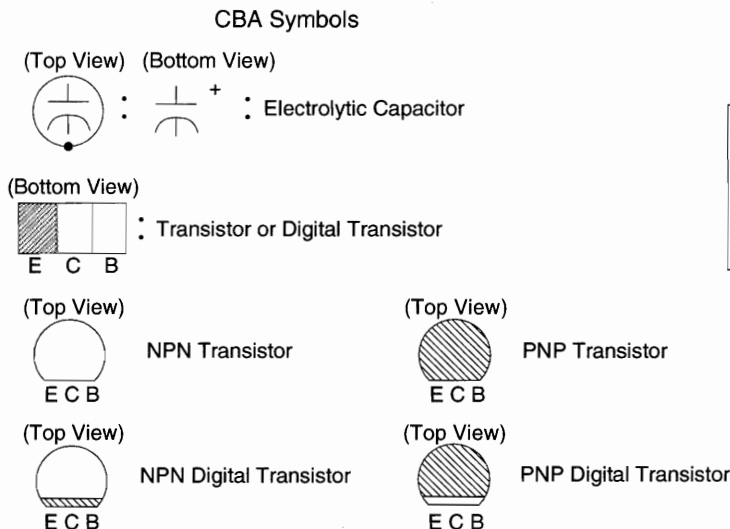
### Tolerance of Capacitors are noted with the following:

Z ---  $+80 \sim -20\%$

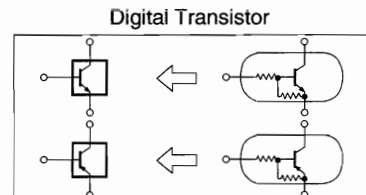
### Note of Resistors:

CEM --- Cement Res.    MTL --- Metal Res.    F --- Fuse Res.

Capacitors and transistors are represented by the following symbols.

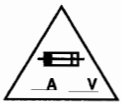


Schematic Diagram Symbols



**LILIST OF CAUTION, NOTES, AND SYMBOLS USED IN THE SCHEMATIC DIAGRAMS ON THE FOLLOWING PAGES:**

1. **CAUTION:** FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE. ATTENTION: POUR UNE PROTECTION CONTINUE LES RISQUES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.



RISK OF FIRE-REPLACE FUSE AS MARKED.

**2. CAUTION:**

Fixed Voltage (or Auto voltage selectable) power supply circuit is used in this unit. If Main Fuse (F001) is blown, first check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.

**3. Note:**

- (1) Do not use the part number shown on the drawings for ordering. The correct part number is shown in the parts list, and may be slightly different or amended since the drawings were prepared.
- (2) To maintain original function and reliability of repaired units, use only original replacement parts which are listed with their part numbers in the parts list section of the service manual.

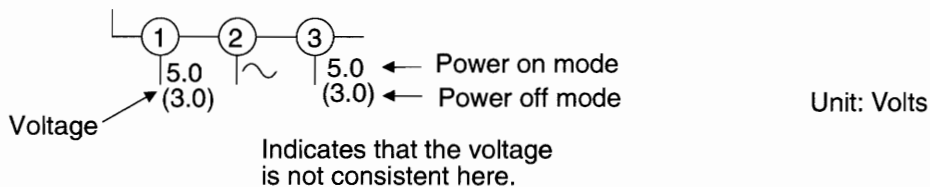
**4. Wire Connectors**

- (1) Prefix symbol "CN" means "connector" (can disconnect and reconnect).
- (2) Prefix symbol "CL" means "wire-solder holes of the PCB" (wire is soldered directly).

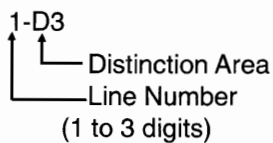
5. Note: Mark "•" is a leadless (chip) component.

**6. Voltage indications on the schematics are as shown below:**

Plug the TV power cord into a standard AC outlet.

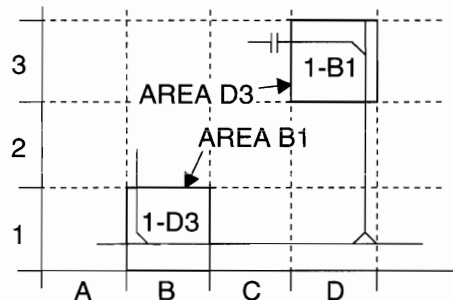


**7. How to read converged lines**



Examples:

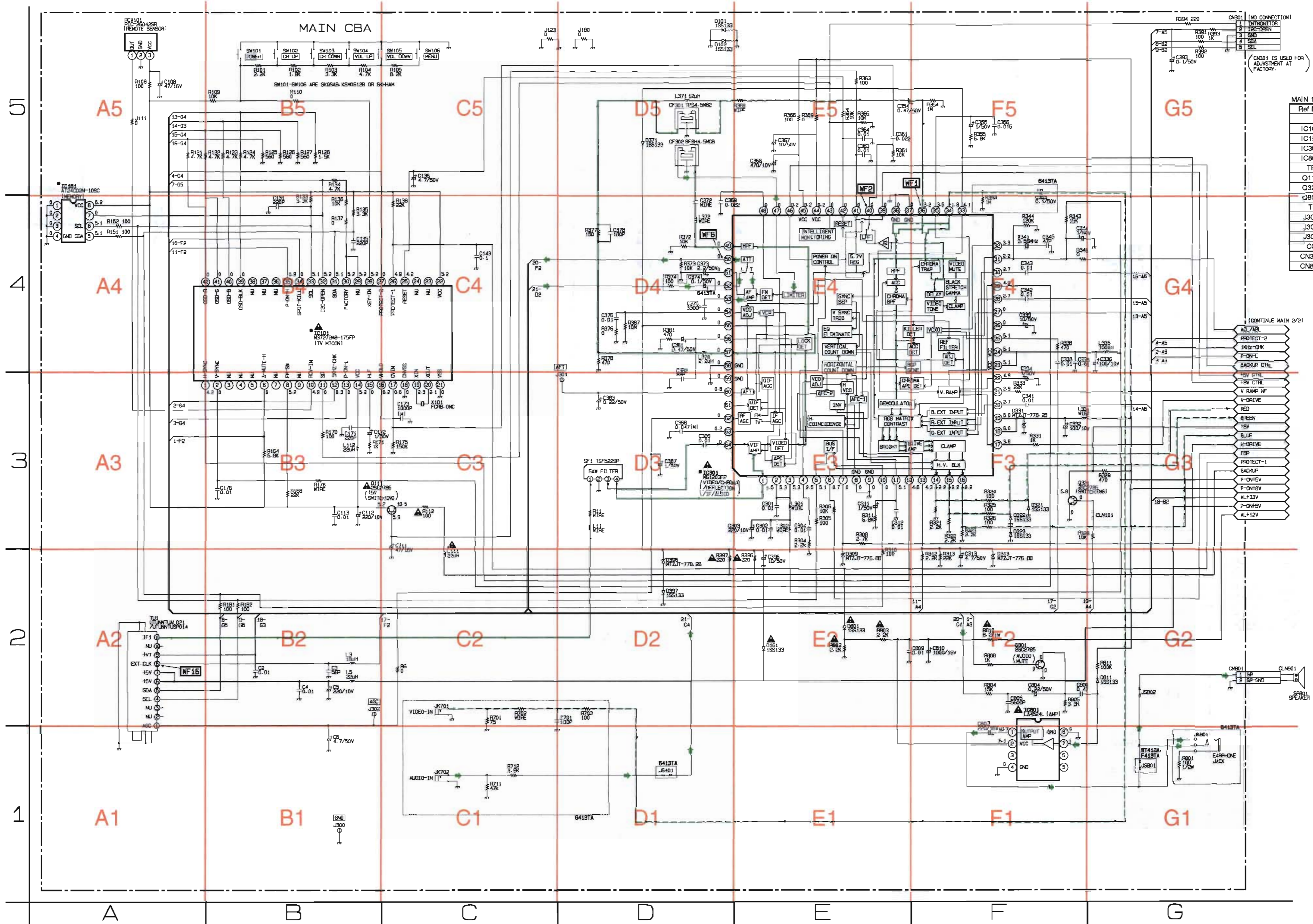
- 1. "1-D3" means that line number "1" goes to area "D3".
- 2. "1-B1" means that line number "1" goes to area "B1".



**8. Test Point Information**

- ⊙ : Indicates a test point with a jumper wire across a hole in the PCB.
- : Used to indicate a test point with a component lead on foil side.
- ⊘ : Used to indicate a test point with no test pin.
- : Used to indicate a test point with a test pin.

Main 1/2 Schematic Diagram



MAIN 1/2

Ref No.	Position	ICS
IC101	B-4	
IC151	A-5	
IC301	D-3	
IC801	F-2	
TRANSISTORS		
Q111	C-3	
Q321	F-3	
Q801	F-2	
TEST POINTS		
J300	B-1	
J301	D-3	
J302	B-2	
CONNECTORS		
CN301	G-5	
CN801	G-2	

(CONTINUE MAIN 2/2)

AGL/ABL
PROTECT-2
VIDEO-CHK
P-DN-L
BACKUP CTL
HV CTRL
HV CTRL
V RAMP NF
V-DRIVE
RED
GREEN
HV
BLUE
H-DRIVE
FBP
PROTECT-1
BACKUP
P-ONHV
P-ONHV
AL+13V
P-ONHV
AL+12V

# Main 2/2 & CRT Schematic Diagram

### CAUTION !

Fixed voltage power supply circuit is used in this unit.  
If Main Fuse (F601) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.



**CAUTION**  
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.  
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.  
**RISK OF FIRE-REPLACE FUSE AS MARKED.**

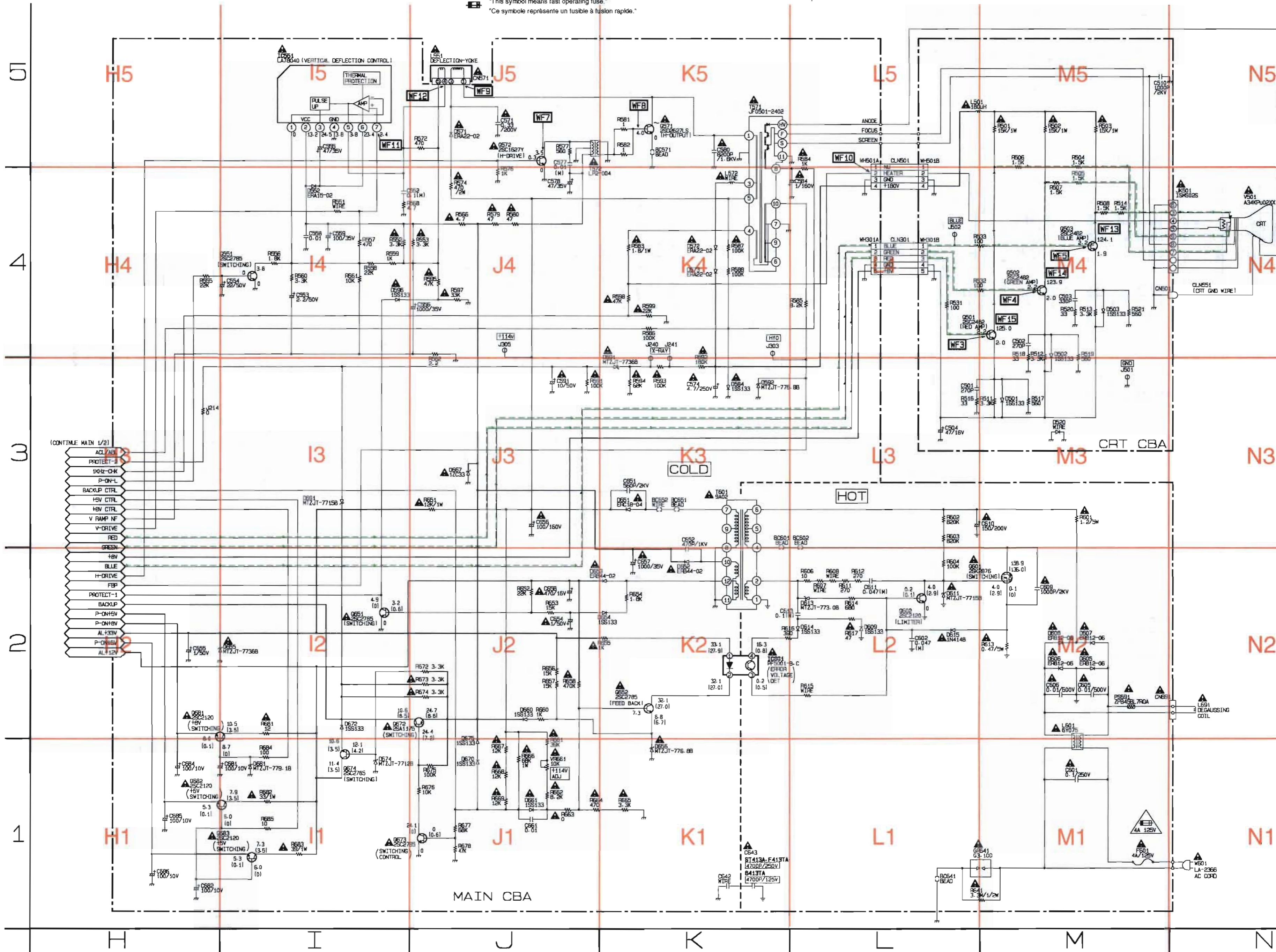
\*This symbol means fast operating fuse.\*  
\*Ce symbole représente un fusible à fusion rapide.\*

**BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER SUPPLY CIRCUIT, AN ISOLATION TRANSFORMER MUST BE USED. ALSO, IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT SLOWLY, WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY CIRCUIT, A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.**

### NOTE :

The voltage for parts in hot circuit is measured using hot GND as a common terminal.

----- Luminance + Chrominance



CRT	
Ref No.	Position
<b>TRANSISTORS</b>	
Q501	M-4
Q502	M-4
Q503	M-4
<b>TEST POINTS</b>	
J501	M-3
J502	L-4
<b>CONNECTORS</b>	
CN501	N-4
WH301B	L-4
WH501B	L-5

MAIN 2/2	
Ref No.	Position
<b>ICS</b>	
IC551	I-5
IC601	K-2
<b>TRANSISTORS</b>	
Q551	I-4
Q571	K-5
Q572	J-5
Q601	M-2
Q602	L-2
Q651	I-2
Q652	K-2
Q672	J-2
Q673	J-1
Q674	I-1
Q681	H-2
Q682	H-1
Q683	H-1
<b>TEST POINTS</b>	
J240	K-4
J241	K-4
J303	K-4
J305	J-4
<b>CONNECTORS</b>	
CN571	J-5
CN691	N-2
WH301A	L-4
WH501A	L-5
<b>VARIABLE RESISTORS</b>	
VR661	J-1



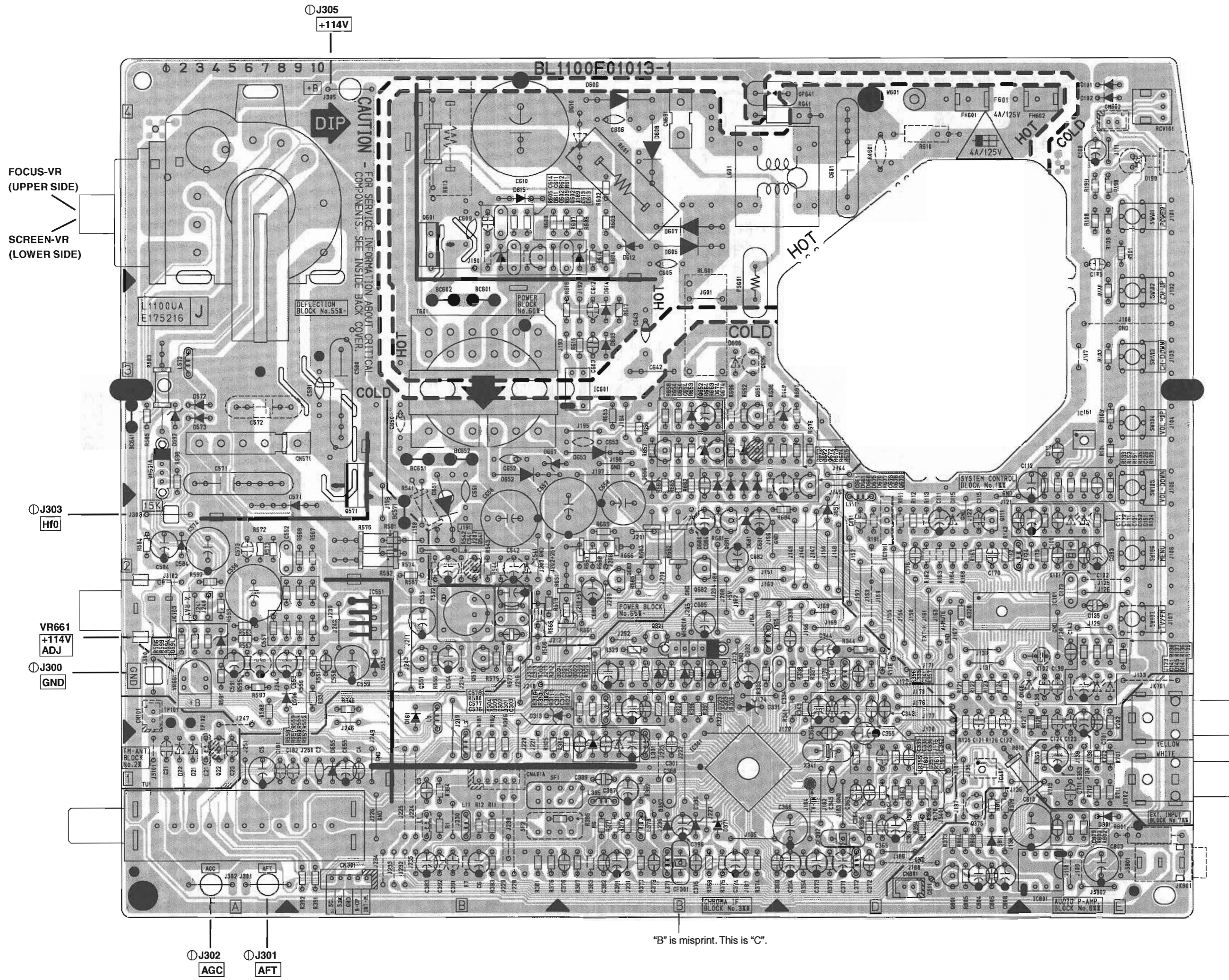
Main CBA Top View

**CAUTION !**  
Fixed voltage power supply circuit is used in this unit.  
If Main Fuse (F601) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply. Otherwise it may cause some components in the power supply circuit to fail.



**CAUTION**  
FOR CONTINUED PROTECTION AGAINST FIRE HAZARD, REPLACE ONLY WITH THE SAME TYPE FUSE.  
ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES D'INCELE N'UTILISER QUE DES FUSIBLE DE MEMO TYPE.  
**RISK OF FIRE-REPLACE FUSE AS MARKED.**  
\*This symbol means fast operating fuse.\*  
\*Ce symbole représente un fusible à fusion rapide.\*

**BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER SUPPLY CIRCUIT, AN ISOLATION TRANSFORMER MUST BE USED. ALSO, IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT SLOWLY, WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY CIRCUIT, A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.**



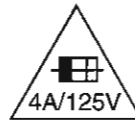
MAIN CBA

Ref No.	Position
ICS	
IC101	E-2
IC151	E-3
IC301	C-1
IC551	B-2
IC801	C-3
IC801	E-1
TRANSISTORS	
Q111	D-2
Q321	C-2
Q551	B-2
Q571	B-2
Q572	B-2
Q601	B-4
Q602	C-4
Q651	C-3
Q652	C-3
Q672	D-3
Q673	D-2
Q674	D-2
Q681	C-2
Q682	C-2
Q683	C-2
Q801	D-1
TEST POINTS	
J240	A-2
J241	A-2
J300	A-2
J301	A-1
J302	A-1
J303	A-2
J305	B-4
CONNECTORS	
CN301	B-1
CN571	A-3
CN691	C-4
CN801	D-1
WH301A	C-2
WH501A	A-3
VARIABLE RESISTORS	
VR661	A-2

"B" is misprint. This is "C".

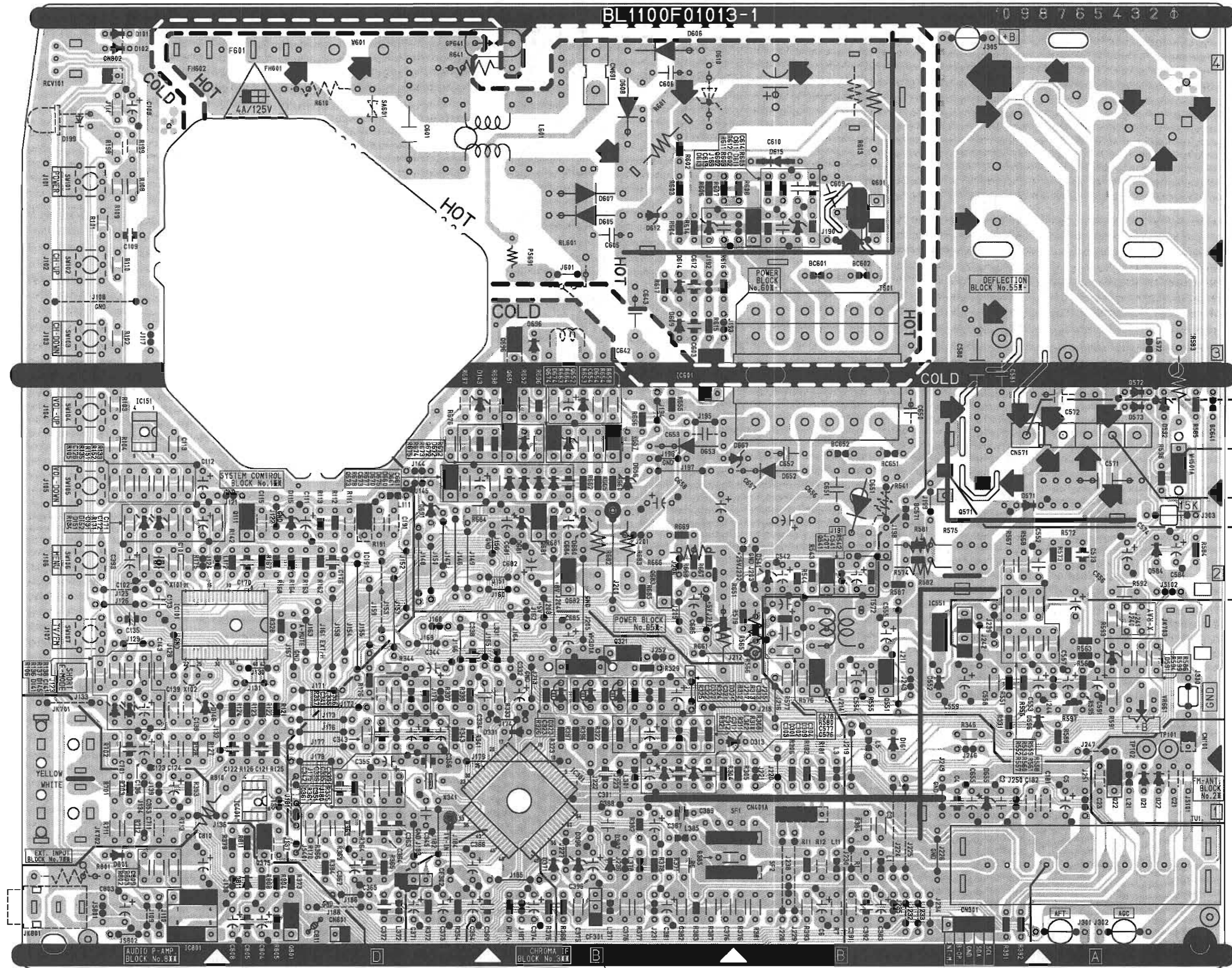
8-2 F/R

**CAUTION !**  
 Fixed voltage power supply circuit is used in this unit.  
 If Main Fuse (F601) is blown, check to see that all components in the power supply circuit are not defective before you connect the AC plug to the AC power supply.  
 Otherwise it may cause some components in the power supply circuit to fail.



**CAUTION**  
 FOR CONTINUED PROTECTION AGAINST FIRE HAZARD,  
 REPLACE ONLY WITH THE SAME TYPE FUSE.  
 ATTENTION : POUR UNE PROTECTION CONTINUE LES RISQUES  
 D'INCENDIE N'UTILISER QUE DES FUSIBLES DE MEMO TYPE.  
**RISK OF FIRE-REPLACE FUSE AS MARKED.**  
 \*This symbol means fast operating fuse.\*  
 \*Ce symbole représente un fusible à fusion rapide.\*

**BECAUSE A HOT CHASSIS GROUND IS PRESENT IN THE POWER SUPPLY CIRCUIT, AN ISOLATION TRANSFORMER MUST BE USED. ALSO, IN ORDER TO HAVE THE ABILITY TO INCREASE THE INPUT SLOWLY, WHEN TROUBLESHOOTING THIS TYPE POWER SUPPLY CIRCUIT, A VARIABLE ISOLATION TRANSFORMER IS REQUIRED.**



- WF9  
PIN 1  
OF CN571
- WF10  
PIN 2  
OF WH501A
- WF12  
PIN 4  
OF CN571
- WF8  
Q571  
Base
- WF11  
PIN 7  
OF IC551

- WF2  
PIN 40  
OF IC301
- WF1  
C354(-)LEAD
- WF6  
PIN50  
OF IC301

"B" is misprint. This is "C".

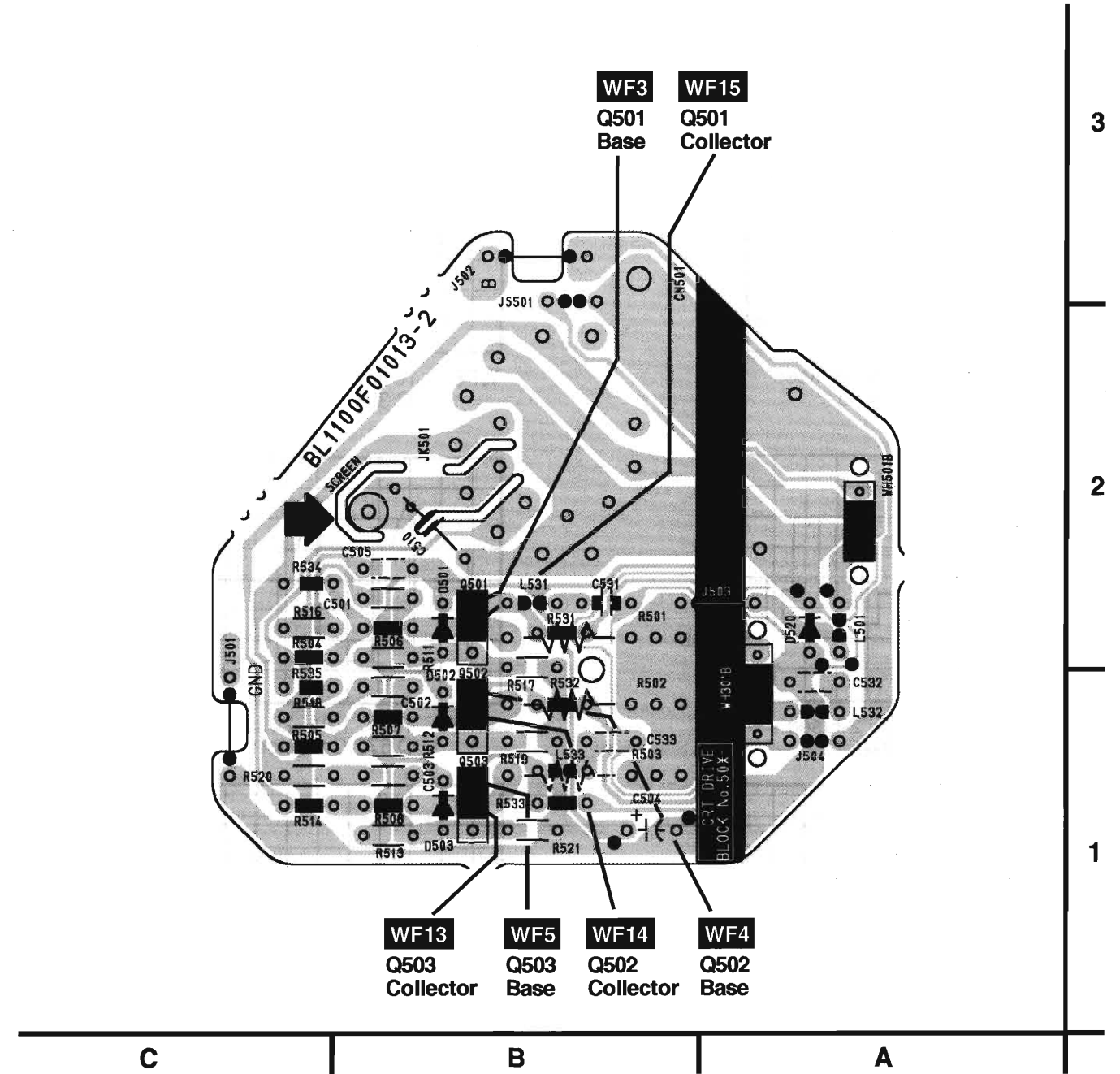
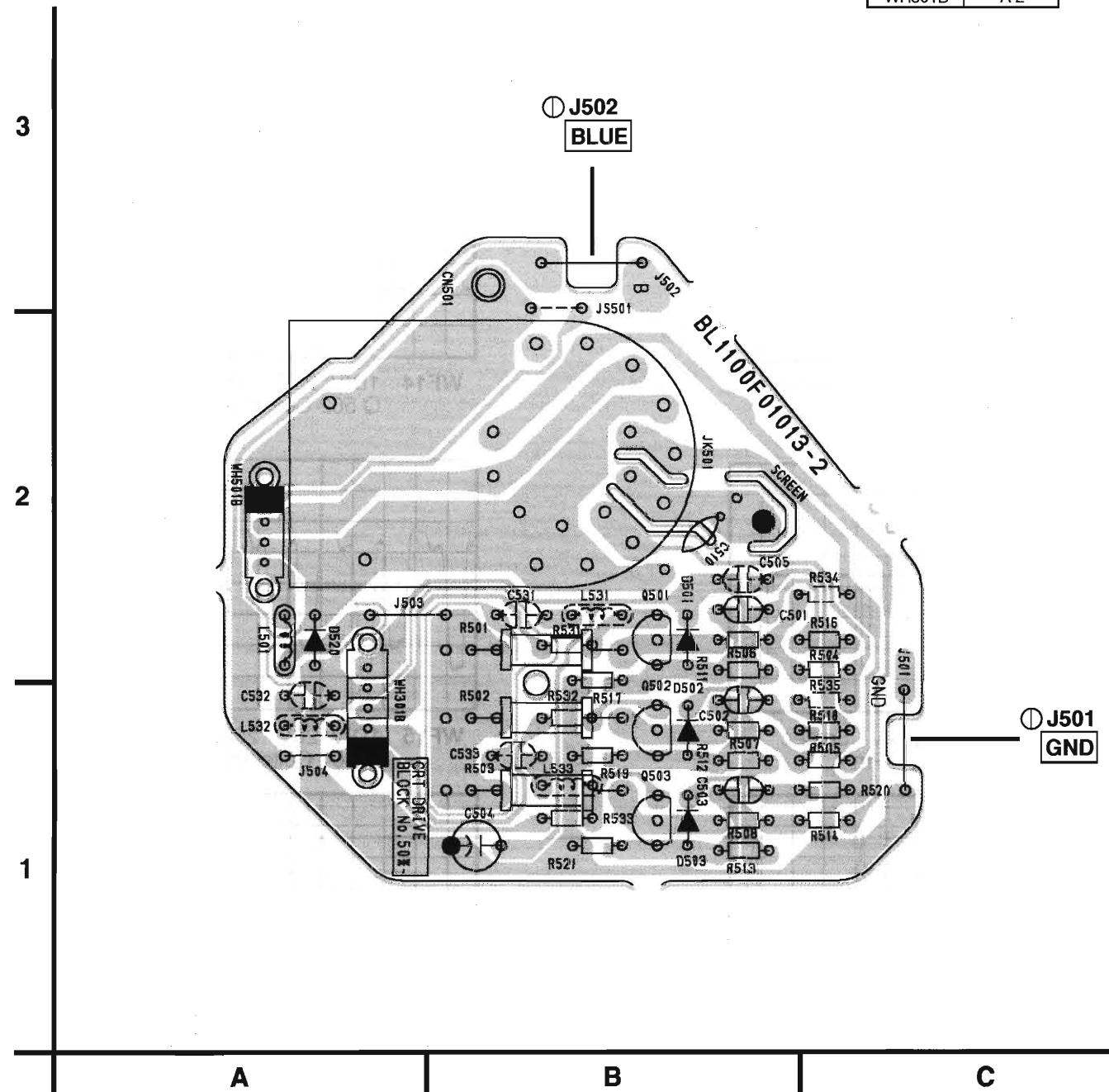
- WF7  
Q572  
Collector
- WF16  
PIN 8  
OF TU1

CRT CBA Top View

CRT CBA Bottom View

CRT CBA

Ref No.	Position
TRANSISTORS	
Q501	B-2
Q502	B-1
Q503	B-1
TEST POINTS	
J501	C-2
J502	B-3
CONNECTORS	
CN501	B-3
WH301B	A-1
WH501B	A-2



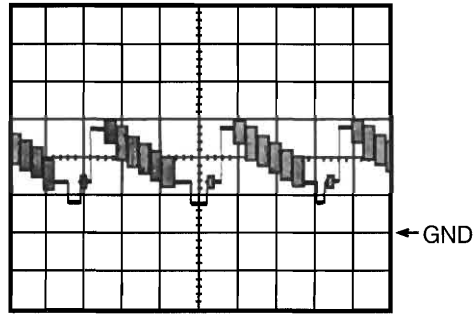
# WAVEFORMS

Input: NTSC Color Bar Signal (with 1kHz Audio Signal)

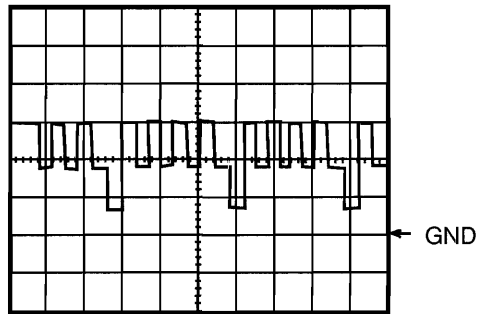
INITIAL POSITION: Unplug unit from AC outlet for at least 5 minutes.  
reconnect to AC outlet and then turn power on.

(Brightness---Center Color---Center Tint --- Center Contrast---Approx 70%)

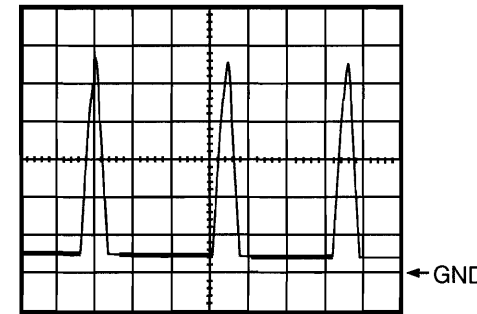
WF1 ~ WF16 = Waveforms to be observed at  
Waveform check points.  
(Shown in Schematic Diagram.)



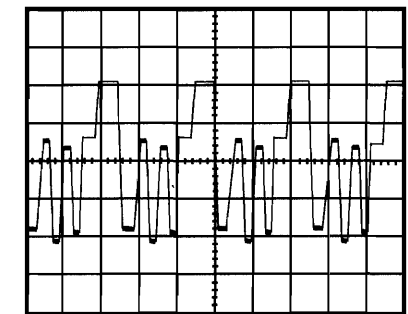
WF1 1DIV: 0.5V 20μsec  
C 354 Minus Lead



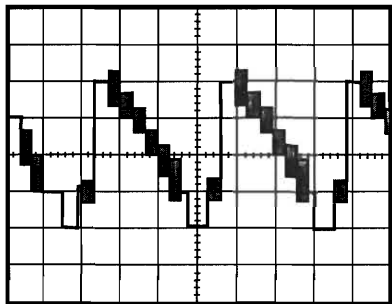
WF5 1DIV: 2V 20μsec  
Q 503 Base



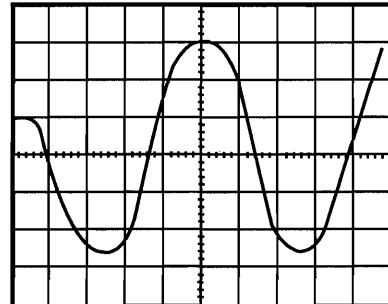
WF9 1DIV: 200V 20μsec  
CN 571 Pin 1



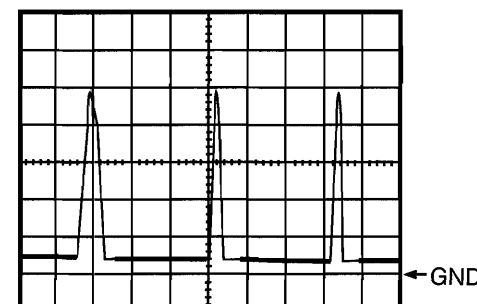
WF13 1DIV: 20V 20μsec  
Q503 Collector



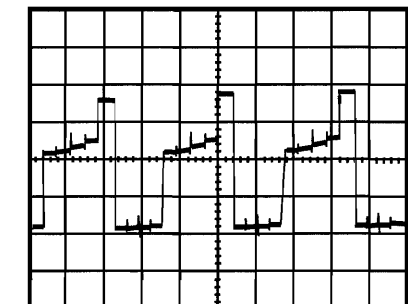
WF2 1DIV: 0.5V 20μsec  
IC 301 Pin 40



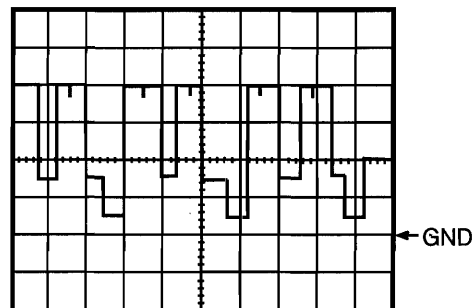
WF6 1DIV: 0.2V 20msec  
IC 301 Pin 50



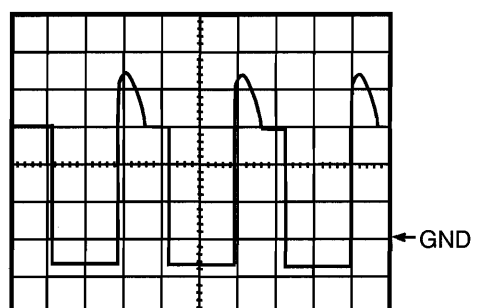
WF10 1DIV: 5V 20μsec  
WH501A Pin 2



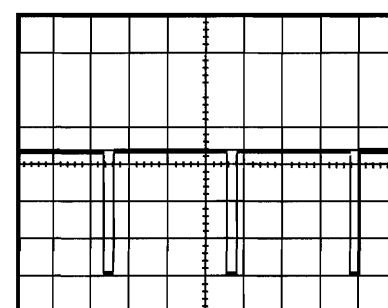
WF14 1DIV: 20V 20μsec  
Q 502 Collector



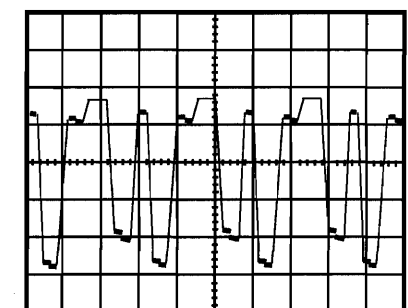
WF3 1DIV: 2V 20μsec  
Q501 Base



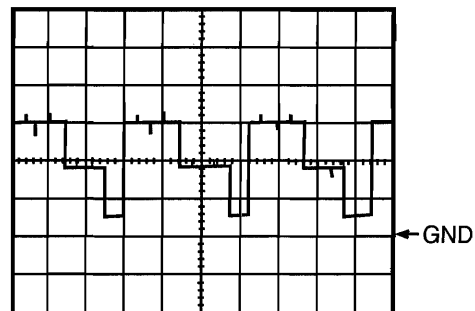
WF7 1DIV: 10V 20μsec  
Q 572 Collector



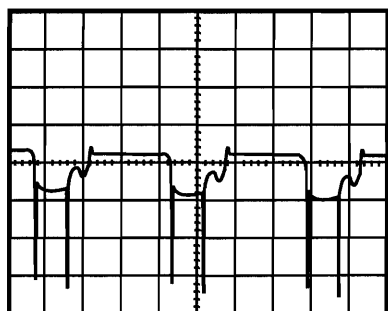
WF11 1DIV: 2V 5msec  
IC 551 Pin 7



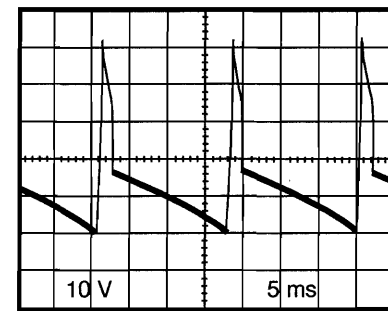
WF15 1DIV: 20V 20μsec  
Q 501 Collector



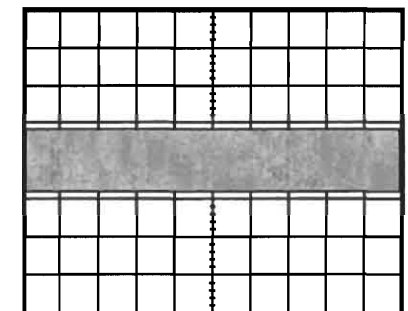
WF4 1DIV: 2V 20μsec  
Q 502 Base



WF8 1DIV: 5V 20μsec  
Q 571 Base

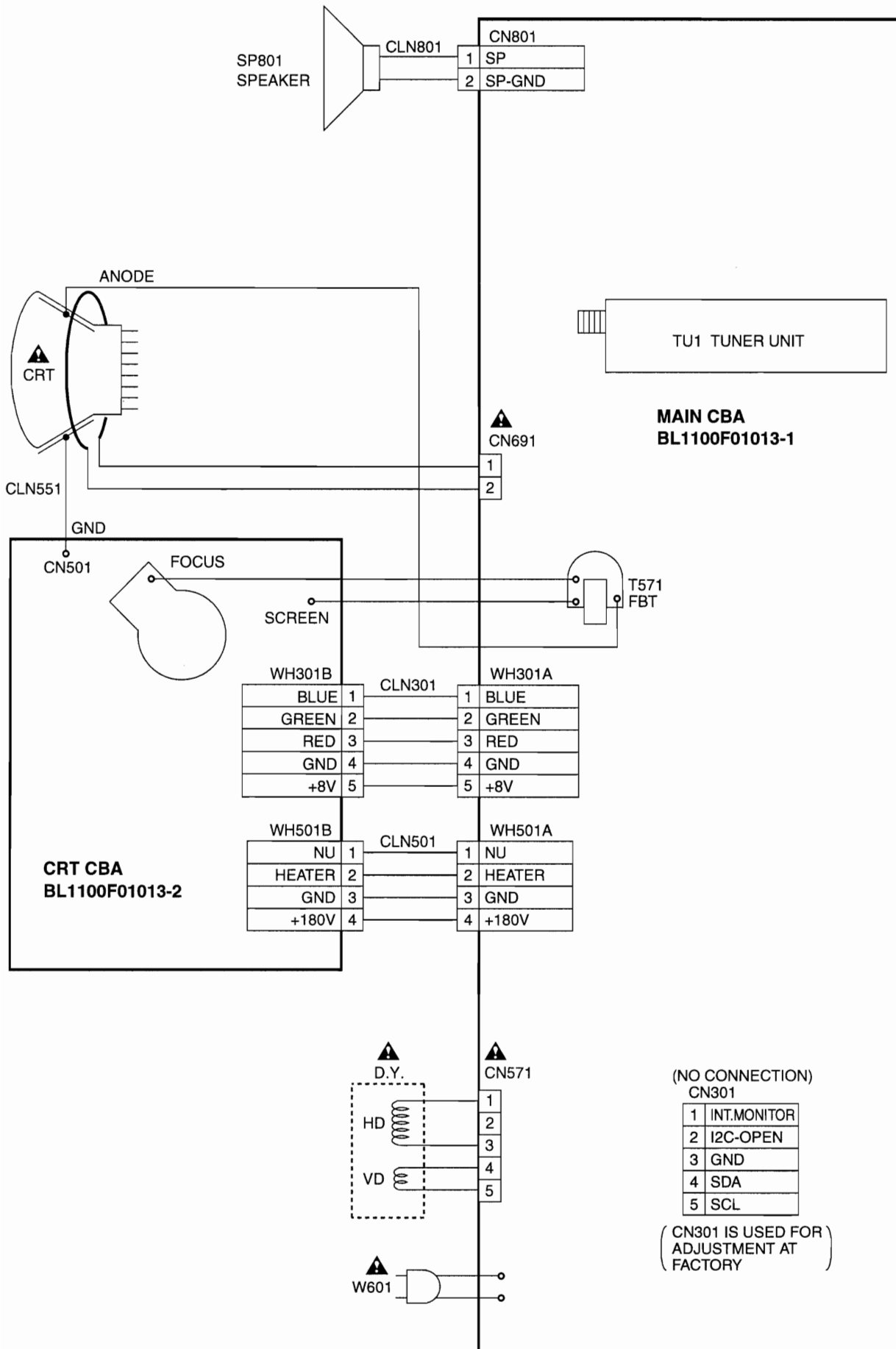


WF12 1DIV: 10V 5msec  
CN 571 Pin 4



WF16 1DIV: 0.2V 20μsec  
TU 1 Pin 8

# WIRING DIAGRAM



# IC PIN FUNCTIONS

## IC101 (TV Micro Computer)

Pin No.	Signal Name	Function
1	H SYNC	Input For Horizontal Synchronize Signal
2	V SYNC	Input For Vertical Synchronize Signal
3		Not Used
4	EXT-H	Ext-H
5		Not Used
6	A-MUTE	Audio Mute
7		Not Used
8		Not Used
9		Not Used
10	RCV-IN	Input For Remote Control
11	SD	Detection SD signal
12	1kHz-CHK	Power Supply Protection
13	P-ON-L	Output for P-ON-L
14	VCC	+5V
15	HLF	Filter for CCD
16	VHOLD	VHOLD
17	CVIN	Input for Video Signal
18	CV Vss	GND
19	XIN	Input for Oscillator
20	XOUT	Output for Oscillator
21	VSS	GND
22	VCC	+5V
23		Not Used
24		Not Used
25	RESET	RESET
26	PROTECT-1	Power Supply Protection
27	PROTECT-2	Power Supply Protection
28	KEY IN	Key Input (Main)
29		Not Used
30	FACTORY	Factort Key Input
31	SDA	I2C-BUS Controller Interface (Data)
32	I2C-OPEN	White Balance Adjustment Judgement
33	SCL	I2C-BUS Controller Interface (Clock)

Pin No.	Signal Name	Function
34	SPOT-KILL	Spot Countermeasure
35	P-ON-H	Output for P-ON-H
36		Not Used
37		Not Used
38		Not Used
39	OSD-BLK	Picture Shut Down Output
40	OSD-B	Blue Output
41	OSD-G	Green Output
42	OSD-R	Red Output

## IC301 (IF/Video/Chrominance/Deflection)

Pin No.	Signal Name	Function
1	IF IN 2	IF Input 2
2	IF-VCC1	IF-VCC 1
3	IF-VCC2	IF VCC 2
4	H. VCO-FB	H. VCO-FB
5	SCL	SCL
6	FBP- IN	FBP Input
7	H-OUT	H-Output
8	DEF GND 1	DEF GND 1
9	DEF GND 2	DEF GND 2
10	SDA	SDA
11	AFC FILTER 1	AFC Filter 1
12	INV. FBP-OUT	INV. FBP-OUT
13	P-ON-CTRL	Power on Control Output
14	R-OUT	R Output
15	G-OUT	G Output
16	B-OUT	B Output
17	V-OUT	Vertical Out
18	VCC 1	Start up VCC 1
19	VCC 2	Start up VCC 2
20	B-IN	OSD Blue Input
21	V-RAMP NF	V Ramp NF

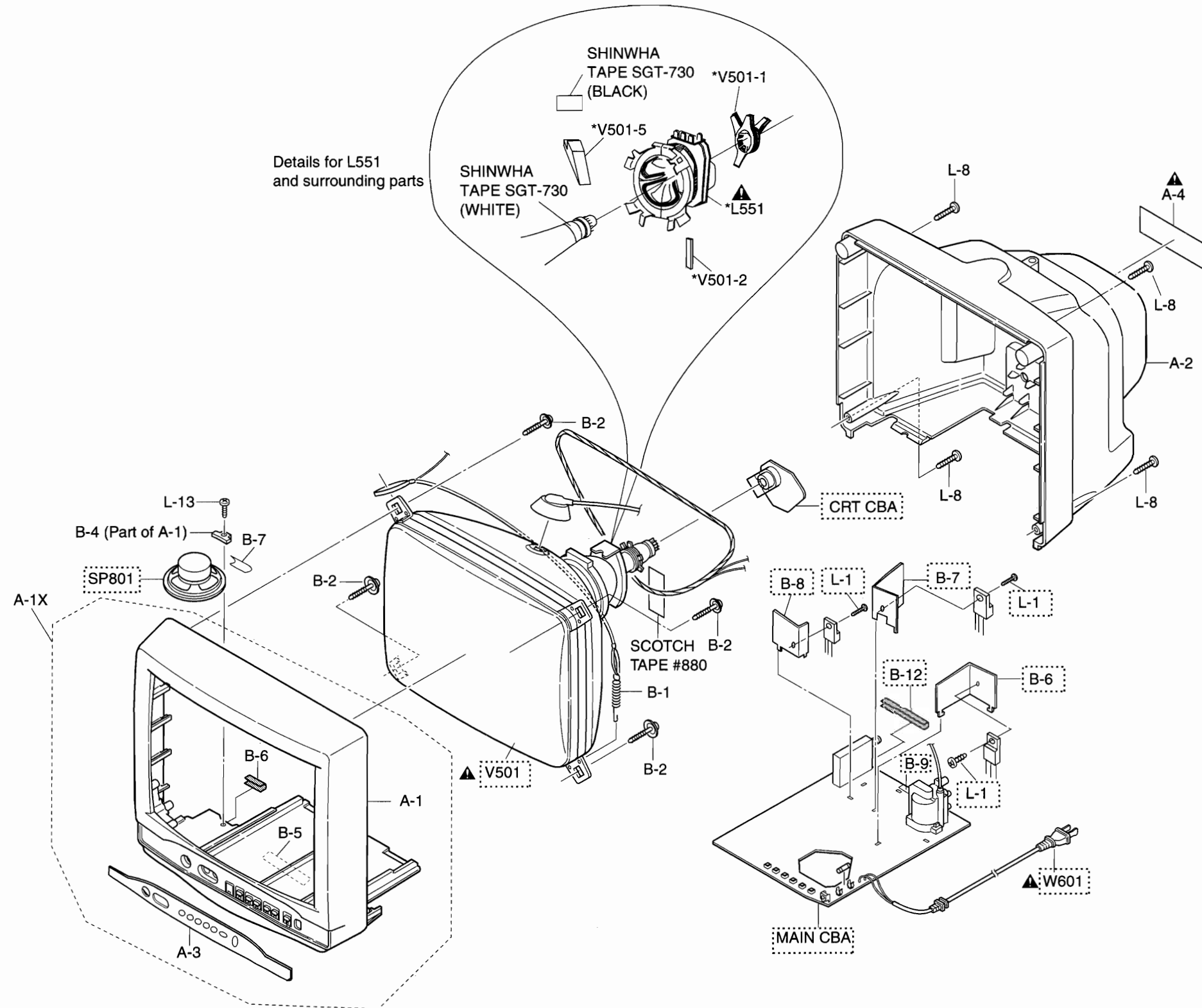
Pin No.	Signal Name	Function
22	V RAMP	Filter for V Ramp
23	VC-VCC1	VC VCC 1
24	VC-VCC2	VC VCC 2
25	FSC-OUT	Freq. Sub carrier Output
26	SPOT-KILLER	Spot-Killer
27	FAST BLK	Fast Blanking Input
28	G-IN	OSD Green Input
29	V PULSE OUT	V-Pulse Output
30	R-IN	OSD Red Input
31	ACL/ABL	ACL/ABL
32	X-TAL 3.58	Chroma Osc
33	8.7V OUT	8.7V Output
34	EXT-IN	External Input
35	CHROMA APC FILTER	Filter for CHROMA APC
36	TV-IN	TV Input
37	VC GND 1	VC GND 1
38	VC GND 2	VC GND 2
39	VC GND 3	VC GND 3
40	Y-SW OUT	Y-SW Output
41	5.7V OUT	5.7V Output
42	Reset	MCU Reset Output
43	INTERIGENT MONITOR	Interigent Monitor Out
44	Hi Vcc 1	Hi Vcc 1
45	Hi Vcc 2	Hi Vcc 2
46	SW. REG. CONT.	Switching Reg. Control Output
47	SIF LIMITER-IN	SIF Limitter Input
48	IF AGC FILTER 2	Filter for IF AGC
49	QIF OUT	QIF Output
50	AUDIO OUT	Audio Output
51	AUDIO BYPASS	Filter for Audio Bypass

Pin No.	Signal Name	Function
52	EXT AUDIO IN	External Audio In
53	FM DETECT OUT	RF Output
54	VIF VCO-FB	VIF VCO-FB
55	REG. Vcc IN	REG. Vcc Input
56	VIDEO APC FILTER	Filter for Video APC
57	VIDEO OUT	Video Out
58	IF GND 1	GND 1
59	IF GND 2	GND 2
60	AFT OUT	AFT Out
61	QIF IN	QIF Input
62	RF AGC OUT	RF AGC Out
63	IF AGC FILTER 1	Filter for IF AGC
64	IF IN 1	IF Input 1

# EXPLODED VIEWS

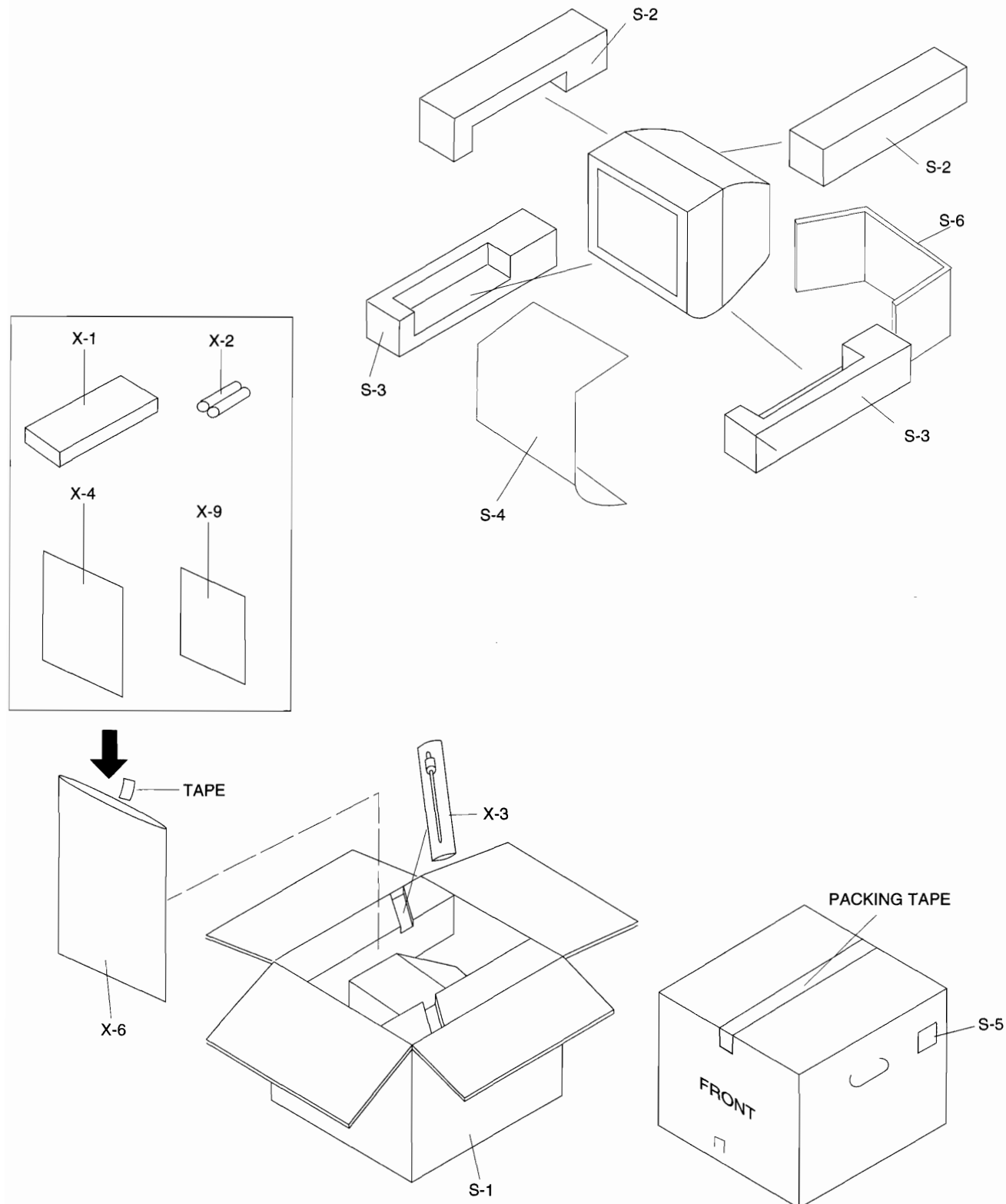
## Cabinet

See Electrical Parts List for parts with mark.  
Some Ref. Number are not in sequence.





# Packing



# MECHANICAL PARTS LIST

**PRODUCT SAFETY NOTE:** Products marked with a have special characteristics important to safety. Before replacing any of these components, read carefully

the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

Ref. No.	Description	Part No.
A-1X	FRONT CABINET ASSEMBLY for Model ST413A	0EM201160
A-1X	FRONT CABINET ASSEMBLY for Model F413TA	0EM201179
A-1X	FRONT CABINET ASSEMBLY for Model 6413TA	0EM201181
A-1	FRONT CABINET	0EM100962
A-3	CONTROL PLATE for Model ST413A	0EM301316
A-3	CONTROL PLATE for Model F413TA	0EM301321
A-3	CONTROL PLATE for Model 6413TA	0EM301277
A-2X	REAR CABINET ASSEMBLY for Model ST413A	0EM201161
A-2X	REAR CABINET ASSEMBLY for Model F413TA	0EM201180
A-2X	REAR CABINET ASSEMBLY for Model 6413TA	0EM201182
A-2	REAR CABINET	0EM000346
A-4	RATING LABEL for Model ST413TA	0EM405397
A-4	RATING LABEL for Model F413TA	0EM405437
A-4	RATING LABEL for Model 6413TA	0EM405439
B-1	TENSION SPRING B0080B0:EM40808	26WH006
B-2	CRT MOUNTING SCREW	0EM403023
B-13	CLOTH(15X10XT0.5)	0EM405038
L-8	SCREW P-TIGHT 4X18 BIND HEAD +	GBMP4180
L-13	SCREW P-TIGHT 3X12 BIND HEAD+	GBMP3120
CLN551	CRT GND WIRE	WX1L7720-001
CLN801	WIRE ASSEMBLY	WX1L9200-001
L691	DEGAUSSING COIL F-017 or DEGAUSSING COIL or DEGAUSSING COIL AVDG013	LLBH00ZTM017 LLBH00ZTZ017 LLBH00ZWR017
SP801	SPEAKER EU77A21 or SPEAKER S08J59B or SPEAKER S08J72A1 or SPEAKER S08J59A	DSD0808E6001 DSD0808XQ001 DSD0808XQ002 1520614

PACKING		
S-1	CARTON for Model ST413TA	0EM405398
S-1	CARTON for Model F413TA	0EM405438
S-1	CARTON for Model 6413TA	0EM405440
S-2	STYRFOAM TOP	0EM000349
S-3	STYRFOAM BOTTOM	0EM000350
S-4	SET SHEET :800X1500	0EM402369
S-5	SERIAL NO. LABEL	0EM405104
S-6	HOLD PAD	0EM405042
X-1	REMOTE CONTROL UNIT 130/ERC001/N0105UD for Model ST413TA	N0105UD
X-1	REMOTE CONTROL UNIT 130/ERC001/N0108UD for Model F413TA	N0108UD
X-2	DRY BATTERY R6P UM3 or DRY BATTERY(SUNRISE) R6SSE/2S or DRY BATTERY R6P/2S	XB0M451GH001 XB0M451MS002 XB0M451T0001
X-3	ROD ANTENNA L7720UA:NTSC W/COO or ROD ANTENNA	0EMN00673 0EMN01599
X-4	OWNER'S MANUAL(E)/(S):ENGLISH/SPANISH for Model ST413A	0EMN01598
X-4	OWNER'S MANUAL(E)/(S):ENGLISH/SPANISH for Model F413TA	0EMN01606
X-4	OWNER'S MANUAL(E)/(S):ENGLISH/SPANISH for Model 6413TA	0EMN01607
X-6	POLYETHYLENE BAG F8626B5	Z325350
X-9	RETURN STOP SHEET for Model ST413A/F413TA	0VM408869A
X-9	RETURN STOP SHEET for Model 6413TA	0VM408870A

Ref. No.	Description	Part No.
CRT PARTS		
V501-1	C.P.MAGNET JH225-FN-00	XM04000BV003
V501-2	RUBBER MAGNET 20X10X1.2	XM05000BV001
V501-5	WEDGE FT-00110W or WEDGE DB25SR	XV10000T4001 XV10000D9001
<b>Note:</b>		
1. V501 (CRT) HAS COUPLE OF SUBSTITUTIONAL PARTS AND EACH PARTS ALSO HAS MATCHING COMBINATION WITH L551.		
2. L551 (DEFLECTION YOKE) HAS MATCHING COMBINATION WITH V501. PLEASE SEE TABLE 1 FOR DETAILS AND COMBINATION.		
V501	CRT(BARE+DY) A34AGT13X09 K or CRT A34AGT13X or CRT A34JLL90X(W) or CRT A34KQW42X or CRT A34KPU02XX	TCRT190CP021 TCRT190CP036 TCRT190QS015 TCRT190SM013 TCRT190GS016
L551	DEFLECTION YOKE	See Table 1

**Table 1 (V501 and L551 Combination)**

V 501 CRT Type No.	V 501: CRT Part No.	L 551: Deflectio Yoke Part No.
A34AGT13X09 K	TCRT190CP021	V501, L551, V501-1, V501-2 and V501-5 are included
A34AGT13X	TCRT190CP036	LLBY00ZMS011
A34JLL90X(W)	TCRT190QS015	LLBY00ZMS005
A34KQW42X	TCRT190SM013	LLBY00ZMS006 or LLBY00ZSY002or LLBY00ZSM004
A34KPU02XX	TCRT190GS016	LLBY00ZSY002or LLBY00ZMS003

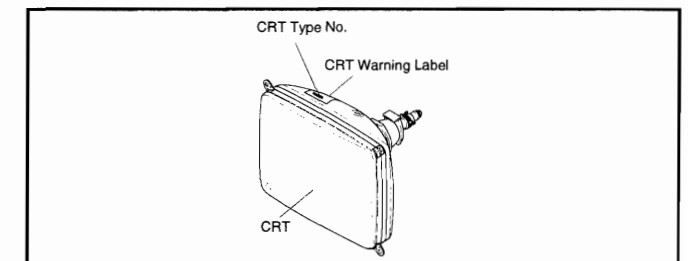
**Note:** Purity and Convergence Adjustments must be performed following CRT replacement. Refer to Electrical Adjustment Instructions.

**Note:**

Please confirm CRT Type No. on the CRT Warning Label which is located on the CRT. Then See the Table 1 for V501 and L551 combination chart.

Please refer this CRT, Deflection Yoke combination chart for parts order.

## CRT Warning Label Location



# ELECTRICAL PARTS LIST

**PRODUCT SAFETY NOTE:** Products marked with a **▲** have special characteristics important to safety. Before replacing any of these components, read carefully the product safety notice in this service manual. Don't degrade the safety of the product through improper servicing.

**NOTE:** Parts that not assigned part numbers (-----) are not available.

Tolerance of Capacitors and Resistors are noted with the following symbols.

C.....±0.25%	D.....±0.5%	F.....±1%
G.....±2%	J.....±5%	K.....±10%
M.....±20%	N.....±30%	Z.....+80/-20%

## MMA CBA

Ref. No.	Description	Part No.
	MMA CBA (MMA-283) for Model ST413A/F413TA	0ESA03364
	MMA CBA (MMA-285) for Model 6413TA	0ESA03398
	Consists of the following	
	Main CBA	-----
	CRT CBA	-----

## Main CBA

Ref. No.	Description	Part No.
	Main CBA	-----
	Consists of the following	
<b>CAPACITORS</b>		
C2	CERAMIC CAP. F Z 0.01µF/50V	CCD1JZS0F103
C3	CHIP CERAMIC CAP. SL J 56pF/50V	CHE1JJBLSL560
C4	CERAMIC CAP.(AX) F Z 0.01µF/25V	CDA1EZT0F103
C5	ELECTROLYTIC CAP. 220µF/10V M	CE1AMASTL221
C6	ELECTROLYTIC CAP. 4.7µF/50V M	CE1JMASTL4R7
C108	ELECTROLYTIC CAP. 47µF/16V M	CE1CMASTL470
C111	ELECTROLYTIC CAP. 47µF/16V M	CE1CMASTL470
C112	ELECTROLYTIC CAP. 220µF/10V M	CE1AMASTL221
C113	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C131	CHIP CERAMIC CAP. B K 220pF/50V	CHE1JKB0B221
C135	CERAMIC CAP.(AX) B K 220pF/50V	CCA1JKT0B221
C136	ELECTROLYTIC CAP. 4.7µF/50V M	CE1JMASTL4R7
C143	CHIP CERAMIC CAP. F Z 0.1µF/50V	CHE1JZB0F104
C171	CHIP CERAMIC CAP. B K 220pF/50V	CHE1JKB0B221
C172	ELECTROLYTIC CAP. 1µF/50V M or ELECTROLYTIC CAP. 1µF/50V M	CE1JMASTL010 CE1JMASTL1R0
C173	FILM CAP.(P) 0.001µF/50V J or FILM CAP.(P) 0.001µF/50V J or *MYLAR CAP. 0.001µF/50V J TV or MYLAR CAP. 0.001µF/50V K	CA1J102MS029 CMA1JJS00102 CMB1JJS00102 2250102S
C176	CERAMIC CAP.(AX) F Z 0.01µF/25V	CDA1EZT0F103
C301	CERAMIC CAP.(AX) F Z 0.01µF/25V	CDA1EZT0F103
C302	CERAMIC CAP.(AX) F Z 0.01µF/25V	CDA1EZT0F103
C303	ELECTROLYTIC CAP. 220µF/10V M	CE1AMASTL221
C304	CERAMIC CAP.(AX) Y M 0.01µF/16V	CDA1CMT0Y103
C311	ELECTROLYTIC CAP. 1µF/50V M or ELECTROLYTIC CAP. 1µF/50V M	CE1JMASTL010 CE1JMASTL1R0
C312	CHIP CERAMIC CAP. B K 0.01µF/50V	CHE1JKB0B103
C313	ELECTROLYTIC CAP. 4.7µF/50V M	CE1JMASTL4R7
C332	ELECTROLYTIC CAP. 100µF/10V M	CE1AMASTL101
C334	ELECTROLYTIC CAP. 1µF/50V or ELECTROLYTIC CAP. 1µF/50V M LL	CA1J1R0SP054 CE1JMASLL010
C335	CERAMIC CAP.(AX) F Z 0.01µF/25V	CDA1EZT0F103
C336	ELECTROLYTIC CAP. 100µF/10V M	CE1AMASTL101
C338	CERAMIC CAP.(AX) F Z 0.01µF/25V	CDA1EZT0F103
C339	ELECTROLYTIC CAP. 10µF/50V M	CE1JMASTL100
C341	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C342	CERAMIC CAP.(AX) F Z 0.01µF/25V	CDA1EZT0F103

Ref. No.	Description	Part No.
C343	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C344	ELECTROLYTIC CAP. 1µF/50V M or ELECTROLYTIC CAP. 1µF/50V M	CE1JMASTL010 CE1JMASTL1R0
C345	CERAMIC CAP. CH J 47pF/50V	CCD1JJSCH470
C353	ELECTROLYTIC CAP. 0.1µF/50V M or ELECTROLYTIC CAP. 0.1µF/50V M for Model 6413TA	CE1JMASTLR10 CE1JMASTL0R1
C354	ELECTROLYTIC CAP. 0.47µF/50V M	CE1JMASTLR47
C355	ELECTROLYTIC CAP. 1µF/50V M or ELECTROLYTIC CAP. 1µF/50V M	CE1JMASTL010 CE1JMASTL1R0
C356	CERAMIC CAP.(AX) Y N 0.015µF/6V	CDA0KNT0Y153
C361	CERAMIC CAP.(AX) Y N 0.022µF/6V	CDA0KNT0Y223
C363	CERAMIC CAP.(AX) F Z 0.01µF/25V	CDA1EZT0F103
C364	CERAMIC CAP.(AX) F Z 0.01µF/25V	CDA1EZT0F103
C365	CERAMIC CAP.(AX) F Z 0.1µF/50V	CCA1JZT0F104
C366	ELECTROLYTIC CAP. 470µF/10V M	CE1AMASTL471
C367	ELECTROLYTIC CAP. 10µF/50V M	CE1JMASTL100
C369	CERAMIC CAP.(AX) Y N 0.022µF/6V	CDA0KNT0Y223
C372	PCB JUMPER D0.6-P5.0	JW5.0T
C373	ELECTROLYTIC CAP. 2.2µF/50V M	CE1JMASTL2R2
C374	ELECTROLYTIC CAP. 0.1µF/50V M or ELECTROLYTIC CAP. 0.1µF/50V M for Model 6413TA	CE1JMASTLR10 CE1JMASTL0R1
C375	CHIP CERAMIC CAP. B K 3300pF/50V	CHE1JKB0B332
C376	CHIP CERAMIC CAP. B K 0.01µF/50V	CHE1JKB0B103
C378	CHIP CERAMIC CAP. B K 180pF/50V	CHE1JKB0B181
C381	ELECTROLYTIC CAP. 0.47µF/50V M	CE1JMASTLR47
C382	CHIP CERAMIC CAP. B K 22pF/50V	CHE1JJBLSL220
C383	ELECTROLYTIC CAP. 0.22µF/50V M	CE1JMASTLR22
C387	ELECTROLYTIC CAP. 1µF/50V M or ELECTROLYTIC CAP. 1µF/50V M	CE1JMASTL010 CE1JMASTL1R0
C388	FILM CAP. 0.047µF/50V or FILM CAP. 0.047µF/50V or FILM CAP. 0.047µF/50V or MYLAR CAP. 0.047µF/50V	CMA1JJS00473 CA1J473MS029 CMB1JJS00473 2250473S
C389	CERAMIC CAP.(AX) F Z 0.01µF/25V	CDA1EZT0F103
C393	ELECTROLYTIC CAP. 0.1µF/50V M or ELECTROLYTIC CAP. 0.1µF/50V M	CE1JMASTLR10 CE1JMASTL0R1
C396	ELECTROLYTIC CAP. 10µF/50V M	CE1JMASTL100
C552	FILM CAP.(P) 0.1µF/50V J or FILM CAP.(P) 0.1µF/50V J or FILM CAP.(P) 0.1µF/50V J TV or MYLAR CAP. 0.1µF/50V K	CA1J104MS029 CMA1JJS00104 CMB1JJS00104 2250104S
C553	ELECTROLYTIC CAP. 2.2µF/50V M LL H7 or ELECTROLYTIC CAP. 2.2µF/50V M LL H7	CA1J2R2SP018 CE1JMASHL2R2
C554	ELECTROLYTIC CAP. 22µF/35V M	CE1JMASTL220
C555	ELECTROLYTIC CAP. 47µF/35V M	CE1GMASTL470
C556	ELECTROLYTIC CAP. 1000µF/35V M	CE1GMZNTL102
C558	CHIP CERAMIC CAP. F Z 0.01µF/50V	CHE1JZB0F103
C559	ELECTROLYTIC CAP. 100µF/35V M	CE1GMASTL101
C571 ▲	PP CAP. 0.33µF/200V J	CT2E334MS040
C574 ▲	ELECTROLYTIC CAP. 4.7µF/250V M	CE2EMASTL4R7

\*Mylar is a registered trademark of E. I. Du Pont de Nemours and Company.

Ref. No.	Description	Part No.
C577	FILM CAP.(P) 0.01μF/50V J or FILM CAP.(P) 0.01μF/50V J or MYLAR CAP. 0.01μF/50V J TV or MYLAR CAP. 0.01μF/50V K	CA1J103MS029 CMA1JJS00103 CMB1JJS00103 2250103S
C578	ELECTROLYTIC CAP. 47μF/35V M	CE1GMASSTL470
C580 ▲	PP CAP. 0.0082μF/1.6kV J	CT3C822MS039
C584	ELECTROLYTIC CAP. 1μF/160V M	CE2CMASSTL1R0
C591 ▲	ELECTROLYTIC CAP. 10μF/50V M	CE1JMASTL100
C601 ▲	FILM CAP.(MP) 0.1μF/250V M or ACROSS THE LINE CAPA 0.1μF/250V M	CT2E104DC009 CT2E104MS035
C602	FILM CAP.(P) 0.047μF/50V J or FILM CAP.(P) 0.047μF/50V J TV or MYLAR CAP. 0.047μF/50V K	CA1J473MS029 CMA1JJS00473 CMB1JJS00473 2250473S
C605 ▲	CERAMIC CAP. 0.01μF/AC250V or CERAMIC CAP. F Z 0.01μF/500V	CCD2EZA0F103 CCD2JZD0F103
C606 ▲	CERAMIC CAP. 0.01μF/AC250V or CERAMIC CAP. F Z 0.01μF/500V	CCD2EZA0F103 CCD2JZD0F103
C609	CERAMIC CAP. B K 1000pF/2kV or CERAMIC CAP. B K 1000pF/2kV or CERAMIC CAP. 0.001μF/2kV	CA3D102MR030 CCD3DKD0B102 CCD3DKP0B102
C610 ▲	ALUMINIUM ELECTROLYTIC CAP150μF/200V or ELECTROLYTIC CAPACITOR 150μF/200V	CA2D151NC088 CA2D151S6012
C611	FILM CAP.(P) 0.047μF/50V J or FILM CAP.(P) 0.047μF/50V J or FILM CAP.(P) 0.047μF/50V J TV or MYLAR CAP. 0.047μF/50V K	CA1J473MS029 CMA1JJS00473 CMB1JJS00473 2250473S
C613	FILM CAP.(P) 0.1μF/50V J or FILM CAP.(P) 0.1μF/50V J or FILM CAP.(P) 0.1μF/50V J TV or MYLAR CAP. 0.1μF/50V K	CA1J104MS029 CMA1JJS00104 CMB1JJS00104 2250104S
C642	PCB JUMPER D0.6-P10.0	JW10.0T
C643 ▲	SAFETY CAP. E M 4700pF/250V or CERAMIC CAP. 0.0047μF CS for Model ST413A/F413TA	CCG2EMP0E472 CCG2HMN0F472
C643 ▲	SAFETY CAP. 4700pF/125V MX for Model 6413TA	CCF2BMA0F472
C651	CERAMIC CAP. LB 560pF/2kV or CERAMIC CAP. BN 560PF/2KV	CA3D561KG004 CCD3DKA0B561
C652	CERAMIC CAP. B K 470PF/1kV	CCD3AKP0B471
C654	ELECTROLYTIC CAP. 1μF/50V M or ELECTROLYTIC CAP. 1μF/50V M	CE1JMASTL010 CE1JMASTL1R0
C655	ELECTROLYTIC CAP. 1μF/50V M or ELECTROLYTIC CAP. 1μF/50V M	CE1JMASTL010 CE1JMASTL1R0
C656	ELECTROLYTIC CAP. 100μF/160V M	CE2CMZPTL101
C657	ELECTROLYTIC CAP. 1000μF/35V M	CE1GMZNTL102
C658	ELECTROLYTIC CAP. 470μF/16V M	CE1CMASSTL471
C661	CERAMIC CAP.(AX) F Z 0.01μF/25V	CDA1EZT0F103
C681	ELECTROLYTIC CAP. 100μF/10V M	CE1AMASTL101
C682	ELECTROLYTIC CAP. 100μF/10V M	CE1AMASTL101
C684	ELECTROLYTIC CAP. 100μF/10V M	CE1AMASTL101
C685	ELECTROLYTIC CAP. 100μF/10V M	CE1AMASTL101
C686	ELECTROLYTIC CAP. 100μF/10V M	CE1AMASTL101
C701	CERAMIC CAP.(AX) B K 100pF/50V for Model 6413TA.	CCA1JKT0B101
C803	ELECTROLYTIC CAP. 220μF/16V M	CE1CMASSTL221
C804	ELECTROLYTIC CAP. 0.22μF/50V M	CE1JMASTLR22
C805	CERAMIC CAP.(AX) X K 5600pF/16V	CDA1CKT0X562
C808	CERAMIC CAP. 0.47μF/50V M	CA1J474TU014
C809	CHIP CERAMIC CAP. F Z 0.01μF/50V	CHE1JZB0F103
C810	ELECTROLYTIC CAP. 100μF/16V M	CE1CMZNTL102
<b>CONNECTORS</b>		
CN301	CONNECTOR BASE 5P TUC-P05P-B1	J3TUA05TG001
CN571 ▲	CONNECTOR BASE 5P RTB-1.5-5P or CONNECTOR BASE 5P TV-50P-05-V2 or CONNECTOR BASE 5P W-P3005-02	J3RTC05JG001 J3TVC05TG002 1730812
CN691 ▲	CONNECTOR BASE 2P RTB-1.5-2P or	J3RTC02JG001

Ref. No.	Description	Part No.
CN801	CONNECTOR BASE 2P TV-50P-02-V2 STRAIGHT CONNECTOR BASE or STRAIGHT PIN HEADER 2P 173981-2	J3TVC02TG002 J383C02UG002 1770258
<b>DIODES</b>		
D101	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D102	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D161 ▲	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D309	ZENER DIODE MTZJT-776.8B	QDTB0MTZJ6R8
D313	ZENER DIODE MTZJT-776.8B	QDTB0MTZJ6R8
D321	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D322	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D323	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D331	ZENER DIODE MTZJT-778.2B	QDTB0MTZJ8R2
D371	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D396	ZENER DIODE MTZJT-778.2B	QDTB0MTZJ8R2
D397	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D552	RECTIFIER DIODE ERA15-02	AERA1502****
D571 ▲	RECTIFIER DIODE ERA22-02 or RECTIFIER DIODE 10ELS2	QDPZ0ERA2202 QDQZ0010ELS2
D572	RECTIFIER DIODE ERA22-02 or RECTIFIER DIODE 10ELS2	QDPZ0ERA2202 QDQZ0010ELS2
D573	RECTIFIER DIODE ERA22-02 or RECTIFIER DIODE 10ELS2	QDPZ0ERA2202 QDQZ0010ELS2
D584	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D591 ▲	ZENER DIODE MTZJT-7736B	QDTB00MTZJ36
D592	ZENER DIODE MTZJT-776.8B	QDTB0MTZJ6R8
D596 ▲	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D605 ▲	RECTIFIER DIODE ERB12-06	QDQZ0ERB1206
D606 ▲	RECTIFIER DIODE ERB12-06	QDQZ0ERB1206
D607 ▲	RECTIFIER DIODE ERB12-06	QDQZ0ERB1206
D608 ▲	RECTIFIER DIODE ERB12-06	QDQZ0ERB1206
D609	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D611	ZENER DIODE MTZJT-7715B	QDTB00MTZJ15
D613	ZENER DIODE MTZJT-773.0B	QDTB0MTZJ3R0
D614	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D615	SWITCHING DIODE 1N4148 T-77	QDTZ001N4148
D651 ▲	FAST RECOVERY DIODE ERC25-06 or RECOVERY DIODE ERC18-04	QDQZ0ERC2506 QDZZ0ERC1804
D652 ▲	FAST RECOVERY DIODE ERB44-02	QDPZ0ERB4402
D653 ▲	FAST RECOVERY DIODE ERB44-02	QDPZ0ERB4402
D654	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or	NDTZ001N4148 QDTZ001SS133

Ref. No.	Description	Part No.
D655	DIODE 1SS176TPA7	1SS176T
D656	ZENER DIODE MTZJT-7736B	QDTB00MTZJ36
D660	ZENER DIODE MTZJT-776.8B	QDTB00MTZJ6R8
D661	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D667	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D670	DIODE 1ZC33	QDQZ0001ZC33
D672	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D674	ZENER DIODE MTZJT-7712B	QDTB00MTZJ12
D675	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D681	ZENER DIODE MTZJT-779.1B	QDTB00MTZJ9R1
D691	ZENER DIODE MTZJT-7715B	QDTB00MTZJ15
D801 ▲	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D811	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
<b>ICS</b>		
IC101 ▲	IC M37272M8-175FP	QSMAB0SMB002
IC151	IC:MEMORY AT24C01A-10SC or IC(EEPROM) M24C01-MN6 or IC(MEMORY) or IC(MEMORY)	NSMMA0SAZ012 NSMMA0SSS028 QSMBA0SRM003 QSMMA0SRM003
IC301 ▲	IC:CHROMA/IF 1 CHIP M61203FP	QSBBA0RMB001
IC551 ▲	VERTICAL OUTPUT IC LA78040	QSBLA0SSY088
IC601 ▲	PHOTO COUPLER PF5001-B,C	QPE300PF5001
IC801 ▲	AUDIO AMP LA4524L	QSBLA0SSY087
<b>COILS</b>		
L3	INDUCTOR 18μH-J-26T or INDUCTOR 18μH-K-26T	LLAXJATTU180 LLAXKDTKA180
L5	INDUCTOR 22μH-K-5FT or INDUCTOR 22μH-K	LLARKBSTU220 LLARKDQKA220
L11	PCB JUMPER D0.6-P5.0	JW5.0T
L111	INDUCTOR 22μH-K-5FT or INDUCTOR 22μH-K	LLARKBSTU220 LLARKDQKA220
L112	INDUCTOR 22μH-J-26T or INDUCTOR 22μH-K-26T	LLAXJATTU220 LLAXKDTKA220
L301	PCB JUMPER D0.6-P5.0	JW5.0T
L302	PCB JUMPER D0.6-P5.0	JW5.0T
L331	PCB JUMPER D0.6-P5.0	JW5.0T
L335	INDUCTOR 100μH-J-5FT or INDUCTOR 100μH-K-5FT	LLARJCSTU101 LLARKDSKA101
L371	INDUCTOR 12μH-J-26T or INDUCTOR 12μH-K-26T	LLAXJATTU120 LLAXKDTKA120
L372	PCB JUMPER D0.6-P5.0	JW5.0T
L378	INDUCTOR 2.2μH-J-26T or INDUCTOR 2.2μH-K-26T	LLAXJATTU2R2 LLAXKDTKA2R2
L385	INDUCTOR 2.2μH-J-26T or INDUCTOR 2.2μH-K-26T	LLAXJATTU2R2 LLAXKDTKA2R2
L572	PCB JUMPER D0.6-P5.0	JW5.0T
L601 ▲	LINE FILTER 5.0mH 6Y075 or LINE FILTER LF005 or LINE FILTER TLF12UA302W1R0	LLBG00ZKT004 LLBG00ZLH001 LLBG00ZTU025
<b>TRANSISTORS</b>		
Q111 ▲	TRANSISTOR KTC3199(GR) or	NQS10KTC3199

Ref. No.	Description	Part No.
Q321	TRANSISTOR KTC3198GR TO-92 or TRANSISTOR 2SC2785(F) or TRANSISTOR 2SC1815-GR(TPE2) or TRANSISTOR 2SC3331(T)-AANP or TRANSISTOR 2SC3331(U)-AANP	NQS40KTC3198 QQSF02SC2785 QSS102SC1815 2SC3331TZ 2SC3331UZ
Q551	TRANSISTOR KTC3199(GR) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR 2SC2785(F) or TRANSISTOR 2SC1815-GR(TPE2) or TRANSISTOR 2SC3331(T)-AANP or TRANSISTOR 2SC3331(U)-AANP	NQS10KTC3199 NQS40KTC3198 QQSF02SC2785 QSS102SC1815 2SC3331TZ 2SC3331UZ
Q571 ▲	TRANSISTOR 2SD2627LS-FEC-YB11	QQZZ02SD2627
Q572 ▲	TRANSISTOR 2SC1627Y-TPE2	QQSY02SC1627
Q601 ▲	MOS FET 2SK2876	QFZZ02SK2876
Q602	TRANSISTOR 2SC2120(Y) or TRANSISTOR 2SC2120-O(TPE2)	QQSY02SC2120 QQS002SC2120
Q651 ▲	TRANSISTOR KTC3199(GR) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR 2SC2785(F) or TRANSISTOR 2SC1815-GR(TPE2) or TRANSISTOR 2SC3331(T)-AANP or TRANSISTOR 2SC3331(U)-AANP	NQS10KTC3199 NQS40KTC3198 QQSF02SC2785 QSS102SC1815 2SC3331TZ 2SC3331UZ
Q652 ▲	TRANSISTOR KTC3199(GR) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR 2SC2785(F) or TRANSISTOR 2SC1815-GR(TPE2) or TRANSISTOR 2SC3331(T)-AANP or TRANSISTOR 2SC3331(U)-AANP	NQS10KTC3199 NQS40KTC3198 QQSF02SC2785 QSS102SC1815 2SC3331TZ 2SC3331UZ
Q672	TRANSISTOR KTA1267(GR) or TRANSISTOR KTA1266(GR) or TRANSISTOR 2SA1175(F) or TRANSISTOR 2SA1015-GR(TPE2) or TRANSISTOR 2SA1318(T)-AANP or TRANSISTOR 2SA1318(U)-AANP	NQS10KTA1267 NQS40KTA1266 QQSF02SA1175 QSS102SA1015 2SA1318TZ 2SA1318UZ
Q673 ▲	TRANSISTOR KTC3199(GR) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR 2SC2785(F) or TRANSISTOR 2SC1815-GR(TPE2) or TRANSISTOR 2SC3331(T)-AANP or TRANSISTOR 2SC3331(U)-AANP	NQS10KTC3199 NQS40KTC3198 QQSF02SC2785 QSS102SC1815 2SC3331TZ 2SC3331UZ
Q674	TRANSISTOR KTC3199(GR) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR 2SC2785(F) or TRANSISTOR 2SC1815-GR(TPE2) or TRANSISTOR 2SC3331(T)-AANP or TRANSISTOR 2SC3331(U)-AANP	NQS10KTC3199 NQS40KTC3198 QQSF02SC2785 QSS102SC1815 2SC3331TZ 2SC3331UZ
Q681 ▲	TRANSISTOR 2SC2120(Y) or TRANSISTOR 2SC2120-O(TPE2)	QQSY02SC2120 QQS002SC2120
Q682 ▲	TRANSISTOR 2SC2120(Y) or TRANSISTOR 2SC2120-O(TPE2)	QQSY02SC2120 QQS002SC2120
Q683 ▲	TRANSISTOR 2SC2120(Y) or TRANSISTOR 2SC2120-O(TPE2)	QQSY02SC2120 QQS002SC2120
Q801	TRANSISTOR KTC3199(GR) or TRANSISTOR KTC3198GR TO-92 or TRANSISTOR 2SC2785(F) or TRANSISTOR 2SC1815-GR(TPE2) or TRANSISTOR 2SC3331(T)-AANP or TRANSISTOR 2SC3331(U)-AANP	NQS10KTC3199 NQS40KTC3198 QQSF02SC2785 QSS102SC1815 2SC3331TZ 2SC3331UZ
<b>RESISTORS</b>		
R6	CHIP RES. 1/10W 0 Ω or	RRXAZB6Z0000

Ref. No.	Description	Part No.
R11	CHIP RES. 1/8W 0 Ω	RRX8JB6Z0000
	PCB JUMPER D0.6-P5.0	JW5.0T
R101	CHIP RES. 1/10W J 2.2k Ω or	RRXAJB6Z0222
	CHIP RES. 1/8W J 2.2k Ω	RRX8JB6Z0222
R102	CHIP RES. 1/10W J 1.8k Ω or	RRXAJB6Z0182
	CHIP RES. 1/8W J 1.8k Ω	RRX8JB6Z0182
R103	CHIP RES. 1/10W J 3.3k Ω or	RRXAJB6Z0332
	CHIP RES. 1/8W J 3.3k Ω	RRX8JB6Z0332
R104	CHIP RES. 1/10W J 4.7k Ω or	RRXAJB6Z0472
	CHIP RES. 1/8W J 4.7k Ω	RRX8JB6Z0472
R105	CHIP RES. 1/10W J 8.2k Ω or	RRXAJB6Z0822
	CHIP RES. 1/8W J 8.2k Ω	RRX8JB6Z0822
R108	CHIP RES. 1/10W J 100 Ω or	RRXAJB6Z0101
	CHIP RES. 1/8W J 100 Ω	RRX8JB6Z0101
R109	CHIP RES. 1/10W J 10k Ω or	RRXAJB6Z0103
	CHIP RES. 1/8W J 10k Ω	RRX8JB6Z0103
R110	CHIP RES. 1/10W 0 Ω or	RRXAZB6Z0000
	CHIP RES. 1/8W 0 Ω	RRX8JB6Z0000
R112	CARBON RES. 1/4W J 100 Ω or	RCX4JATZ0101
	CARBON RES. 1/6W J 100 Ω	RCX6JATZ0101
R121	CARBON RES. 1/4W J 4.7k Ω or	RCX4JATZ0472
	CARBON RES. 1/6W J 4.7k Ω	RCX6JATZ0472
R122	CARBON RES. 1/4W J 4.7k Ω or	RCX4JATZ0472
	CARBON RES. 1/6W J 4.7k Ω	RCX6JATZ0472
R123	CARBON RES. 1/4W J 4.7k Ω or	RCX4JATZ0472
	CARBON RES. 1/6W J 4.7k Ω	RCX6JATZ0472
R124	CARBON RES. 1/4W J 4.7k Ω or	RCX4JATZ0472
	CARBON RES. 1/6W J 4.7k Ω	RCX6JATZ0472
R125	CARBON RES. 1/4W J 560 Ω or	RCX4JATZ0561
	CARBON RES. 1/6W J 560 Ω	RCX6JATZ0561
R126	CARBON RES. 1/4W J 560 Ω or	RCX4JATZ0561
	CARBON RES. 1/6W J 560 Ω	RCX6JATZ0561
R127	CHIP RES. 1/10W J 560 Ω or	RRXAJB6Z0561
	CHIP RES. 1/8W J 560 Ω	RRX8JB6Z0561
R128	CHIP RES. 1/10W J 1.5k Ω or	RRXAJB6Z0152
	CHIP RES. 1/8W J 1.5k Ω	RRX8JB6Z0152
R133	CHIP RES. 1/10W J 3.3k Ω or	RRXAJB6Z0332
	CHIP RES. 1/8W J 3.3k Ω	RRX8JB6Z0332
R134	CHIP RES. 1/10W J 4.7k Ω or	RRXAJB6Z0472
	CHIP RES. 1/8W J 4.7k Ω	RRX8JB6Z0472
R135	CHIP RES. 1/10W J 3.3k Ω or	RRXAJB6Z0332
	CHIP RES. 1/8W J 3.3k Ω	RRX8JB6Z0332
R136	CHIP RES. 1/10W J 10k Ω or	RRXAJB6Z0103
	CHIP RES. 1/8W J 10k Ω	RRX8JB6Z0103
R137	CHIP RES. 1/10W 0 Ω or	RRXAZB6Z0000
	CHIP RES. 1/8W 0 Ω	RRX8JB6Z0000
R138	CHIP RES. 1/10W J 22k Ω or	RRXAJB6Z0223
	CHIP RES. 1/8W J 22k Ω	RRX8JB6Z0223
R151	CHIP RES. 1/10W J 100 Ω or	RRXAJB6Z0101
	CHIP RES. 1/8W J 100 Ω	RRX8JB6Z0101
R152	CHIP RES. 1/10W J 100 Ω or	RRXAJB6Z0101
	CHIP RES. 1/8W J 100 Ω	RRX8JB6Z0101
R164	CARBON RES. 1/4W J 6.8k Ω or	RCX4JATZ0682
	CARBON RES. 1/6W J 6.8k Ω	RCX6JATZ0682
R168	CARBON RES. 1/4W J 22k Ω or	RCX4JATZ0223
	CARBON RES. 1/6W J 22k Ω	RCX6JATZ0223
R170	CHIP RES. 1/10W J 100 Ω or	RRXAJB6Z0101
	CHIP RES. 1/8W J 100 Ω	RRX8JB6Z0101
R171	CHIP RES. 1/10W J 1k Ω or	RRXAJB6Z0102
	CHIP RES. 1/8W J 1k Ω	RRX8JB6Z0102
R175	CHIP RES. 1/10W J 150k Ω or	RRXAJB6Z0154
	CHIP RES. 1/8W J 150k Ω	RRX8JB6Z0154
R176	PCB JUMPER D0.6-P5.0	JW5.0T
R181	CARBON RES. 1/4W J 100 Ω or	RCX4JATZ0101
	CARBON RES. 1/6W J 100 Ω	RCX6JATZ0101
R182	CARBON RES. 1/4W J 100 Ω or	RCX4JATZ0101

Ref. No.	Description	Part No.
R304	CARBON RES. 1/6W J 100 Ω	RCX6JATZ0101
	CARBON RES. 1/4W J 2.2k Ω or	RCX4JATZ0222
	CARBON RES. 1/6W J 2.2k Ω	RCX6JATZ0222
R305	CARBON RES. 1/4W J 100 Ω or	RCX4JATZ0101
	CARBON RES. 1/6W J 100 Ω	RCX6JATZ0101
R306	CARBON RES. 1/4W J 10k Ω or	RCX4JATZ0103
	CARBON RES. 1/6W J 10k Ω	RCX6JATZ0103
R308	CARBON RES. 1/4W J 2.7k Ω or	RCX4JATZ0272
	CARBON RES. 1/6W J 2.7k Ω	RCX6JATZ0272
R310	CARBON RES. 1/4W J 100 Ω or	RCX4JATZ0101
	CARBON RES. 1/6W J 100 Ω	RCX6JATZ0101
R311	CARBON RES. 1/4W J 6.8k Ω or	RCX4JATZ0682
	CARBON RES. 1/6W J 6.8k Ω	RCX6JATZ0682
R312	CARBON RES. 1/4W J 2.2k Ω or	RCX4JATZ0222
	CARBON RES. 1/6W J 2.2k Ω	RCX6JATZ0222
R313	CARBON RES. 1/4W J 22k Ω or	RCX4JATZ0223
	CARBON RES. 1/6W J 22k Ω	RCX6JATZ0223
R321	CARBON RES. 1/4W J 2.2k Ω or	RCX4JATZ0222
	CARBON RES. 1/6W J 2.2k Ω	RCX6JATZ0222
R322	CARBON RES. 1/4W J 2.2k Ω or	RCX4JATZ0222
	CARBON RES. 1/6W J 2.2k Ω	RCX6JATZ0222
R323	CARBON RES. 1/4W J 2.2k Ω or	RCX4JATZ0222
	CARBON RES. 1/6W J 2.2k Ω	RCX6JATZ0222
R324	CARBON RES. 1/4W J 100 Ω or	RCX4JATZ0101
	CARBON RES. 1/6W J 100 Ω	RCX6JATZ0101
R325	CARBON RES. 1/4W J 100 Ω or	RCX4JATZ0101
	CARBON RES. 1/6W J 100 Ω	RCX6JATZ0101
R326	CARBON RES. 1/4W J 100 Ω or	RCX4JATZ0101
	CARBON RES. 1/6W J 100 Ω	RCX6JATZ0101
R328	CARBON RES. 1/4W J 10k Ω or	RCX4JATZ0103
	CARBON RES. 1/6W J 10k Ω	RCX6JATZ0103
R329	CARBON RES. 1/4W J 470 Ω or	RCX4JATZ0471
	CARBON RES. 1/6W J 470 Ω	RCX6JATZ0471
R331	CARBON RES. 1/4W J 1k Ω or	RCX4JATZ0102
	CARBON RES. 1/6W J 1k Ω	RCX6JATZ0102
R333	CHIP RES. 1/10W J 22k Ω or	RRXAJB6Z0223
	CHIP RES. 1/8W J 22k Ω	RRX8JB6Z0223
R338	CARBON RES. 1/4W J 470 Ω or	RCX4JATZ0471
	CARBON RES. 1/6W J 470 Ω	RCX6JATZ0471
R343	CARBON RES. 1/4W J 15k Ω or	RCX4JATZ0153
	CARBON RES. 1/6W J 15k Ω	RCX6JATZ0153
R344	CHIP RES. 1/10W J 120k Ω or	RRXAJB6Z0124
	CHIP RES. 1/8W J 120k Ω	RRX8JB6Z0124
R346	CHIP RES. 1/10W 0 Ω or	RRXAZB6Z0000
	CHIP RES. 1/8W 0 Ω	RRX8JB6Z0000
R353	CARBON RES. 1/4W J 1M Ω or	RCX4JATZ0105
	for Model 6413PTA	RCX6JATZ0105
R354	CARBON RES. 1/4W J 1M Ω or	RCX4JATZ0105
	CARBON RES. 1/6W J 1M Ω	RCX6JATZ0105
R355	CARBON RES. 1/4W J 6.8k Ω or	RCX4JATZ0682
	CARBON RES. 1/6W J 6.8k Ω	RCX6JATZ0682
R361	CARBON RES. 1/4W J 10k Ω or	RCX4JATZ0103
	CARBON RES. 1/6W J 10k Ω	RCX6JATZ0103
R363	CHIP RES. 1/10W J 100 Ω or	RRXAJB6Z0101
	CHIP RES. 1/8W J 100 Ω	RRX8JB6Z0101
R364	CARBON RES. 1/4W J 10k Ω or	RCX4JATZ0103
	CARBON RES. 1/6W J 10k Ω	RCX6JATZ0103
R365	CARBON RES. 1/4W J 10k Ω or	RCX4JATZ0103
	CARBON RES. 1/6W J 10k Ω	RCX6JATZ0103
R366	CHIP RES. 1/10W J 100 Ω or	RRXAJB6Z0101
	CHIP RES. 1/8W J 100 Ω	RRX8JB6Z0101
R368	PCB JUMPER D0.6-P5.0	JW5.0T
R369	CHIP RES. 1/10W 0 Ω or	RRXAZB6Z0000
	CHIP RES. 1/8W 0 Ω	RRX8JB6Z0000
R372	CARBON RES. 1/4W J 10k Ω or	RCX4JATZ0103
	CARBON RES. 1/6W J 10k Ω	RCX6JATZ0103

Ref. No.	Description	Part No.
R373	CARBON RES. 1/4W J 10k Ω or CARBON RES. 1/6W J 10k Ω	RCX4JATZ0103 RCX6JATZ0103
R374	CARBON RES. 1/4W J 100 Ω or CARBON RES. 1/6W J 100 Ω for Model 6413TA	RCX4JATZ0101 RCX6JATZ0101
R376	CHIP RES. 1/10W 0 Ω or CHIP RES. 1/8W 0 Ω	RRXAZB6Z0000 RRX8JB6Z0000
R377	CHIP RES. 1/10W J 150 Ω or CHIP RES. 1/8W J 150 Ω	RRXAJB6Z0151 RRX8JB6Z0151
R378	CARBON RES. 1/4W J 470 Ω or CARBON RES. 1/6W J 470 Ω	RCX4JATZ0471 RCX6JATZ0471
R381	CHIP RES. 1/10W J 470 Ω or CHIP RES. 1/8W J 470 Ω	RRXAJB6Z0471 RRX8JB6Z0471
R385	CHIP RES. 1/10W 0 Ω or CHIP RES. 1/8W 0 Ω	RRXAZB6Z0000 RRX8JB6Z0000
R387	CARBON RES. 1/4W J 10M OHM	RCX4JATZ0106
R391	CARBON RES. 1/4W J 100 Ω or CARBON RES. 1/6W J 100 Ω	RCX4JATZ0101 RCX6JATZ0101
R392	CARBON RES. 1/4W J 100 Ω or CARBON RES. 1/6W J 100 Ω	RCX4JATZ0101 RCX6JATZ0101
R393	CHIP RES. 1/10W J 1k Ω or CHIP RES. 1/8W J 1k Ω	RRXAJB6Z0102 RRX8JB6Z0102
R394	CARBON RES. 1/4W J 220 Ω or CARBON RES. 1/6W J 220 Ω	RCX4JATZ0221 RCX6JATZ0221
R396	CARBON RES. 1/4W J 220 Ω or CARBON RES. 1/6W J 220 Ω	RCX4JATZ0221 RCX6JATZ0221
R397	CARBON RES. 1/4W J 220 Ω or CARBON RES. 1/6W J 220 Ω	RCX4JATZ0221 RCX6JATZ0221
R551	PCB JUMPER D0.6-P5.0	JW5.0T
R552 ▲	CHIP RES. 1/10W J 3.3k Ω or CHIP RES. 1/8W J 3.3k Ω	RRXAJB6Z0332 RRX8JB6Z0332
R553	CHIP RES. 1/10W J 1.5k Ω or CHIP RES. 1/8W J 1.5k Ω	RRXAJB6Z0152 RRX8JB6Z0152
R555	CHIP RES. 1/10W J 22k Ω or CHIP RES. 1/8W J 22k Ω	RRXAJB6Z0223 RRX8JB6Z0223
R556	CARBON RES. 1/4W J 1.8k Ω or CARBON RES. 1/6W J 1.8k Ω	RCX4JATZ0182 RCX6JATZ0182
R557	CHIP RES. 1/10W J 470 Ω or CHIP RES. 1/8W J 470 Ω	RRXAJB6Z0471 RRX8JB6Z0471
R558	CHIP RES. 1/10W J 22k Ω or CHIP RES. 1/8W J 22k Ω	RRXAJB6Z0223 RRX8JB6Z0223
R559	CHIP RES. 1/10W J 1k Ω or CHIP RES. 1/8W J 1k Ω	RRXAJB6Z0102 RRX8JB6Z0102
R560	CHIP RES. 1/10W J 3.3k Ω or CHIP RES. 1/8W J 3.3k Ω	RRXAJB6Z0332 RRX8JB6Z0332
R561	CHIP RES. 1/10W J 10k Ω or CHIP RES. 1/8W J 10k Ω	RRXAJB6Z0103 RRX8JB6Z0103
R562	CARBON RES. 1/4W J 2.2 Ω	RCX4JATZ02R2
R566	FUSE RES. 1/4W J 4.7 Ω or FUSE RES. 1/4W J 4.7 Ω	RFX44R7KA007 RFX44R7UB002
R568	CHIP RES. 1/10W J 4.7 Ω or CHIP RES. 1/8W J 4.7 Ω	RRXAJB6Z04R7 RRX8JB6Z04R7
R572	CARBON RES. 1/4W J 470 Ω or CARBON RES. 1/6W J 470 Ω	RCX4JATZ0471 RCX6JATZ0471
R574 ▲	FIXED METAL OXIDE FILM RES. 2W J 470 Ω or METAL RESISTOR 2W J 470 Ω or METAL RESISTOR 2W J 470 Ω	RN02471KE007 RN02471UB001 RN02471ZU001
R576	CHIP RES. 1/10W J 1k Ω or CHIP RES. 1/8W J 1k Ω	RRXAJB6Z0102 RRX8JB6Z0102
R577	CHIP RES. 1/10W J 560 Ω or CHIP RES. 1/8W J 560 Ω	RRXAJB6Z0561 RRX8JB6Z0561
R579	CARBON RES. 1/4W J 47 Ω or CARBON RES. 1/6W J 47 Ω	RCX4JATZ0470 RCX6JATZ0470
R580	CARBON RES. 1/4W J 47 Ω or CARBON RES. 1/6W J 47 Ω	RCX4JATZ0470 RCX6JATZ0470
R581	CARBON RES. 1/4W J 1 Ω	RCX4JATZ01R0
R582	CARBON RES. 1/4W J 1 Ω	RCX4JATZ01R0

Ref. No.	Description	Part No.
R583 ▲	METAL FILM RES.(STRAIGHT)1W J 1.8 Ω or METAL FILM RES.(STRAIGHT)1W J 1.8 Ω or METAL FILM RES.(STRAIGHT)1W J 1.8 Ω or METAL FILM RES.(STRAIGHT)1W J 1.0 Ω	RN011R8KE009 RN011R8ZU001 RN011R8UB001 RN011R8DP003
R584	CARBON RES. 1/4W J 1k Ω or CARBON RES. 1/6W J 1k Ω	RCX4JATZ0102 RCX6JATZ0102
R585	CARBON RES. 1/4W J 8.2k Ω or CARBON RES. 1/6W J 8.2k Ω	RCX4JATZ0822 RCX6JATZ0822
R586	CHIP RES. 1/10W J 100k Ω or CHIP RES. 1/8W J 100k Ω	RRXAJB6Z0104 RRX8JB6Z0104
R587	CARBON RES. 1/4W J 100k Ω or CARBON RES. 1/6W J 100k Ω	RCX4JATZ0104 RCX6JATZ0104
R588	CARBON RES. 1/4W J 100k Ω or CARBON RES. 1/6W J 100k Ω	RCX4JATZ0104 RCX6JATZ0104
R591	CHIP RES. 1/10W J 100k Ω or CHIP RES. 1/8W J 100k Ω	RRXAJB6Z0104 RRX8JB6Z0104
R592 ▲	CHIP RES. 1/10W J 180k Ω or CHIP RES. 1/8W J 180k Ω	RRXAJB6Z0184 RRX8JB6Z0184
R593	CHIP RES. 1/10W J 100k Ω or CHIP RES. 1/8W J 100k Ω	RRXAJB6Z0104 RRX8JB6Z0104
R594	CHIP RES. 1/10W J 68k Ω or CHIP RES. 1/8W J 68k Ω	RRXAJB6Z0683 RRX8JB6Z0683
R595	CARBON RES. 1/4W J 47k Ω or CARBON RES. 1/6W J 47k Ω	RCX4JATZ0473 RCX6JATZ0473
R597	CHIP RES. 1/10W J 33k Ω or CHIP RES. 1/8W J 33k Ω	RRXAJB6Z0333 RRX8JB6Z0333
R598	CARBON RES. 1/4W J 47k Ω or CARBON RES. 1/6W J 47k Ω	RCX4JATZ0473 RCX6JATZ0473
R599 ▲	CHIP RES. 1/10W J 22k Ω or CHIP RES. 1/8W J 22k Ω	RRXAJB6Z0223 RRX8JB6Z0223
R601 ▲	CEMENT RES. 5W K 1.2 Ω or CEMENT RESISTOR 5W K 1.2 Ω or CEMENT RESISTOR SQZ05S1R2J	RW051R2DP005 RW051R2PG001 RW051R2Y4001
R602	CARBON RES. 1/4W J 820k Ω or CARBON RES. 1/6W J 820k Ω	RCX4JATZ0824 RCX6JATZ0824
R603	CARBON RES. 1/4W J 820k Ω or CARBON RES. 1/6W J 820k Ω	RCX4JATZ0824 RCX6JATZ0824
R604	CARBON RES. 1/4W J 100k Ω or CARBON RES. 1/6W J 100k Ω	RCX4JATZ0104 RCX6JATZ0104
R606	CARBON RES. 1/4W J 10 Ω or CARBON RES. 1/6W J 10 Ω	RCX4JATZ0100 RCX6JATZ0100
R607	PCB JUMPER D0.6-P5.0	JW5.0T
R608	PCB JUMPER D0.6-P5.0	JW5.0T
R611	CARBON RES. 1/4W J 270 Ω or CARBON RES. 1/6W J 270 Ω	RCX4JATZ0271 RCX6JATZ0271
R612	CARBON RES. 1/4W J 270 Ω or CARBON RES. 1/6W J 270 Ω	RCX4JATZ0271 RCX6JATZ0271
R613 ▲	CEMENT RES. 5W K 0.47 Ω or CEMENT RESISTOR 5W J 0.47 Ω	RW05R47DP005 RW05R47PG001
R614	CARBON RES. 1/4W J 680 Ω or CARBON RES. 1/6W J 680 Ω	RCX4JATZ0681 RCX6JATZ0681
R615	PCB JUMPER D0.6-P5.0	JW5.0T
R616	CARBON RES. 1/4W J 390 Ω or CARBON RES. 1/6W J 390 Ω	RCX4JATZ0391 RCX6JATZ0391
R617	CARBON RES. 1/4W J 47 Ω or CARBON RES. 1/6W J 47 Ω	RCX4JATZ0470 RCX6JATZ0470
R641 ▲	CARBON RES. 1/2W J 3.3M Ω or ANTI-SURGE RESISTOR 1/2W J 3.3M Ω	RCX2335A4001 RMX2335KA011
R651	FIXED METAL OXIDE FILM RES. 1W J 12k Ω or FIXED METAL OXIDE FILM RES. 1W J 12k Ω or METAL RESISTOR 1W J 12k Ω or METAL RESISTOR 1W J 12k Ω	RN01123DP003 RN01123KE007 RN01123UB001 RN01123ZU001
R652	CHIP RES. 1/10W J 22k Ω or CHIP RES. 1/8W J 22k Ω	RRXAJB6Z0223 RRX8JB6Z0223
R653	CHIP RES. 1/10W J 15k Ω or CHIP RES. 1/8W J 15k Ω	RRXAJB6Z0153 RRX8JB6Z0153

Ref. No.	Description	Part No.
R654	CHIP RES. 1/10W J 1.8k Ω or CHIP RES. 1/8W J 1.8k Ω	RRXAJB6Z0182 RRX8JB6Z0182
R655	CARBON RES. 1/4W J 1k Ω or CARBON RES. 1/6W J 1k Ω	RCX4JATZ0102 RCX6JATZ0102
R656	CARBON RES. 1/4W J 15k Ω or CARBON RES. 1/6W J 15k Ω	RCX4JATZ0153 RCX6JATZ0153
R657	CHIP RES. 1/10W J 15k Ω or CHIP RES. 1/8W J 15k Ω	RRXAJB6Z0153 RRX8JB6Z0153
R658	CHIP RES. 1/10W J 470k Ω or CHIP RES. 1/8W J 470k Ω	RRXAJB6Z0474 RRX8JB6Z0474
R660	CARBON RES. 1/4W J 1k Ω or CARBON RES. 1/6W J 1k Ω	RCX4JATZ0102 RCX6JATZ0102
R661 ▲	CARBON RES. 1/4W J 39k Ω or CARBON RES. 1/6W J 39k Ω	RCX4JATZ0393 RCX6JATZ0393
R662 ▲	CARBON RES. 1/4W J 8.2k Ω or CARBON RES. 1/6W J 8.2k Ω	RCX4JATZ0822 RCX6JATZ0822
R663	CHIP RES. 1/10W 0 Ω or CHIP RES. 1/8W 0 Ω	RRXAZB6Z0000 RRX8JB6Z0000
R664	CHIP RES. 1/10W J 470 Ω or CHIP RES. 1/8W J 470 Ω	RRXAJB6Z0471 RRX8JB6Z0471
R665	CARBON RES. 1/4W J 3.3k Ω or CARBON RES. 1/6W J 3.3k Ω	RCX4JATZ0332 RCX6JATZ0332
R666	FIXED METAL OXIDE FILM RES. 1W J 68k Ω or FIXED METAL OXIDE FILM RES. 1W J 68k Ω	RN01683DP003 RN01683KE009
R667 ▲	CARBON RES. 1/4W J 12k Ω or CARBON RES. 1/6W J 12k Ω	RCX4JATZ0123 RCX6JATZ0123
R668 ▲	CARBON RES. 1/4W J 12k Ω or CARBON RES. 1/6W J 12k Ω	RCX4JATZ0123 RCX6JATZ0123
R669 ▲	CARBON RES. 1/4W J 12k Ω or CARBON RES. 1/6W J 12k Ω	RCX4JATZ0123 RCX6JATZ0123
R672	CHIP RES. 1/10W J 3.3k Ω or CHIP RES. 1/8W J 3.3k Ω	RRXAJB6Z0332 RRX8JB6Z0332
R673	CARBON RES. 1/4W J 3.3k Ω or CARBON RES. 1/6W J 3.3k Ω	RCX4JATZ0332 RCX6JATZ0332
R674	CARBON RES. 1/4W J 3.3k Ω or CARBON RES. 1/6W J 3.3k Ω	RCX4JATZ0332 RCX6JATZ0332
R675	CHIP RES. 1/10W J 100k Ω or CHIP RES. 1/8W J 100k Ω	RRXAJB6Z0104 RRX8JB6Z0104
R676	CHIP RES. 1/10W J 10k Ω or CHIP RES. 1/8W J 10k Ω	RRXAJB6Z0103 RRX8JB6Z0103
R677	CHIP RES. 1/10W J 68k Ω or CHIP RES. 1/8W J 68k Ω	RRXAJB6Z0683 RRX8JB6Z0683
R678	CHIP RES. 1/10W J 47k Ω or CHIP RES. 1/8W J 47k Ω	RRXAJB6Z0473 RRX8JB6Z0473
R681 ▲	CARBON RES. 1/4W J 12 Ω or CARBON RES. 1/6W J 12 Ω	RCX4JATZ0120 RCX6JATZ0120
R682 ▲	FIXED METAL OXIDE FILM RES. 1W J 33 Ω or FIXED METAL OXIDE FILM RES. 1W J 33 Ω or METAL RESISTOR 1W J 33 Ω	RN01330DP003 RN01330KE007 RN01330UB001 RN01330ZU001
R683 ▲	FIXED METAL OXIDE FILM RES. 1W J 39 Ω or FIXED METAL OXIDE FILM RES. 1W J 39 Ω or FIXED METAL OXIDE FILM RES. 1W J 39 Ω or METAL RESISTOR 1W J 39 Ω	RN01390DP003 RN01390KE007 RN01390UB001 RN01390ZU001
R684	CHIP RES. 1/10W J 100 Ω or CHIP RES. 1/8W J 100 Ω	RRXAJB6Z0101 RRX8JB6Z0101
R685	CARBON RES. 1/4W J 10 Ω or CARBON RES. 1/6W J 10 Ω	RCX4JATZ0100 RCX6JATZ0100
R701	CARBON RES. 1/4W J 75 Ω or CARBON RES. 1/6W J 75 Ω for Model 6413TA	RCX4JATZ0750 RCX6JATZ0750
R702	PCB JUMPER D0.6-P5.0 for Model 6414TA	JW5.0T
R703	CARBON RES. 1/4W J 100 Ω or CARBON RES. 1/6W J 100 Ω for Model 6413TA	RCX4JATZ0101 RCX6JATZ0101
R711	CARBON RES. 1/4W J 47k Ω or CARBON RES. 1/6W J 47k Ω for Model 6413TA	RCX4JATZ0473 RCX6JATZ0473
R712	CARBON RES. 1/4W J 3.9k Ω or	RCX4JATZ0392

Ref. No.	Description	Part No.
R801	CARBON RES. 1/6W J 3.9k Ω for Model 6413TA CARBON RES. 1/2W J 100 Ω or CARBON RES. 1/2W J 100 Ω or	RCX6JATZ0392 RCX2JZP20101 RCX2JZQZ0101
R802 ▲	CARBON RES. 1/2W J 100 Ω for Model 6413TAT CHIP RES. 1/10W J 2.2k Ω or CHIP RES. 1/8W J 2.2k Ω	RCX2101KA013 RRXAJB6Z0222 RRX8JB6Z0222
R803	CHIP RES. 1/10W J 2.2k Ω or CHIP RES. 1/8W J 2.2k Ω	RRXAJB6Z0222 RRX8JB6Z0222
R804	CARBON RES. 1/4W J 15k Ω or CARBON RES. 1/6W J 15k Ω	RCX4JATZ0153 RCX6JATZ0153
R805	CARBON RES. 1/4W J 3.3k Ω or CARBON RES. 1/6W J 3.3k Ω	RCX4JATZ0332 RCX6JATZ0332
R808	CARBON RES. 1/4W J 1k Ω or CARBON RES. 1/6W J 1k Ω	RCX4JATZ0102 RCX6JATZ0102
R810 ▲	FIXED METAL OXIDE FILM RES. 1W J 8.2 Ω or FIXED METAL OXIDE FILM RES. 1W J 8.2 Ω or METAL RESISTOR 1W J 8.2 Ω or METAL RESISTOR 1W J 8.2 Ω	RN018R2DP003 RN018R2KE009 RN018R2UB001 RN018R2ZU001
R811	CARBON RES. 1/4W J 100k Ω or CARBON RES. 1/6W J 100k Ω	RCX4JATZ0104 RCX6JATZ0104
J111	CHIP RES. 1/10W 0 Ω or CHIP RES. 1/8W 0 Ω	RRXAZB6Z0000 RRX8JB6Z0000
J123	CHIP RES. 1/10W 0 Ω or CHIP RES. 1/8W 0 Ω	RRXAZB6Z0000 RRX8JB6Z0000
J180	CHIP RES. 1/10W 0 Ω or CHIP RES. 1/8W 0 Ω	RRXAZB6Z0000 RRX8JB6Z0000
J214	CHIP RES. 1/10W 0 Ω or CHIP RES. 1/8W 0 Ω	RRXAZB6Z0000 RRX8JB6Z0000
<b>SWITCHES</b>		
SW101	TACT SWITCH SKHHAM or TACT SWITCH SKQSAB or PUSH SWITCH KSM0612B	SST0101AL029 SST0101AL038 SST0101HH003
SW102	TACT SWITCH SKHHAM or TACT SWITCH SKQSAB or PUSH SWITCH KSM0612B	SST0101AL029 SST0101AL038 SST0101HH003
SW103	TACT SWITCH SKHHAM or TACT SWITCH SKQSAB or PUSH SWITCH KSM0612B	SST0101AL029 SST0101AL038 SST0101HH003
SW104	TACT SWITCH SKHHAM or TACT SWITCH SKQSAB or PUSH SWITCH KSM0612B	SST0101AL029 SST0101AL038 SST0101HH003
SW105	TACT SWITCH SKHHAM or TACT SWITCH SKQSAB or PUSH SWITCH KSM0612B	SST0101AL029 SST0101AL038 SST0101HH003
SW106	TACT SWITCH SKHHAM or TACT SWITCH SKQSAB or PUSH SWITCH KSM0612B	SST0101AL029 SST0101AL038 SST0101HH003
<b>CRYSTAL OSCILLATORS</b>		
X101	CERAMIC RESONATOR KBR-8.0MKC or CERAMIC RESONATOR ZTT 8.00MHz or CERAMIC FILTER CSTS0800MG003 or CERAMIC RESONATOR FCR8.0MC	FY0805PKC002 FY0805PLN001 FY0805PMR001 FY0805PTE001
X341	CRYSTAL OSCILLATOR 3.579545MHz	FXD355LLN002
<b>MISCELLANEOUS</b>		
B-6	HEAT SINK(PDZ)	0EM405394
B-7	HEAT SINK(PEA)	0EM405395
B-8	HEAT SINK(PEB)	0EM405396
B-9 ▲	CHASSIS NO.LABEL for Model ST413A/F413TA	0EM405423
B-9 ▲	CHASSIS NO.LABEL for Model 6413TA	0EM405435
B-10	JACK HOLDER for Model 6413TA	0EM404325
B-12	CLOTH(65) L7735TR:65X10X0.5T	0EM402149
BC571	BEAD INDUCTORS FBA04HA600VB-00	LLBF00STU026
BC601	BEAD INDUCTORS FBR07HA121TB-00	LLBF00ZTU021
BC602	BEAD INDUCTORS 1-03-BAR-510X	LLBF00ZF8001
	BEAD INDUCTORS B16RHWW3.5X10X1.3	LLBF00ZXM002
BC641	BEAD INDUCTORS FBR07HA121TB-00	LLBF00ZTU021

Ref. No.	Description	Part No.
BC651	BEAD INDUCTORS FBR07HA121TB-00	LLBF00ZTU021
BC652	BEAD INDUCTORS FBR07HA121TB-00	LLBF00ZTU021
CF301	CERAMIC FILTER TPS 4.5MB2	1810897
CF302	CERAMIC FILTER SFSH4.5MCB	FBB455PMR001
CLN1	LEAD WIRE UL1007TC AWG26 100MM	WX3401A6FF10
CLN101	LEAD WIRE UL1007TC AWG26 100MM	WX3401A6FF10
CLN301	WIRE ASSEMBLY 5P L=330	WX1L9700-004
F601 ▲	FUSE 4A/125V 237 TYPE	PAGJ20CAG402
FH601	FUSE HOLDER FH-V-03078 or FUSE HOLDER MSF-015 or HOLDER FUSE CNT41-0014	XH01Z00DK001 XH01Z00LY001 1790424
FH602	FUSE HOLDER FH-V-03078 or FUSE HOLDER MSF-015 or HOLDER FUSE CNT41-0014	XH01Z00DK001 XH01Z00LY001 1790424
GP641 ▲	GAP. G3.35 or GAP. G3.10D or GAP. WSG-R-3.10	FAZ000LD6002 FAZ000LD6004 FAZ000LW1002
IC551 ▲	VERTICAL OUTPUT IC LA78040	QSBLA0SSY088
JK701	RCA JACK 1P AV-8.4-9Y for Model 6413ATA	JXR0101RP010
JK702	RCA JACK 1P AV-8.4-9W for Model 64117	JXRL0101RP011
JK801	EARPHONE JACK LGY6501-0600 for Model 6413TA	JYSL030SR001
JS401	PCB JUMPER D0.6-P10.0 for Model 6413TA	JW10.0T
JS801	PCB JUMPER D0.6-P5.0 for Model ST413A/F413TA	JW5.0T
JS802	PCB JUMPER D0.6-P7.5	JW7.5T
L-1	B-TITE SCREW 3X8 BIND + CHROME	GBMB3080
PCB-1	MAIN PCB	BL1100F01011
PS691 ▲	POSISTER ZPB45BL7R0A	QNZZ45BL7R0A
RCV101	REMOCON RECEIVE UNIT PIC-26042SR	USESJRKK023
SF1	SAW FILTER TSF5229P	FBB456PSY008
T571 ▲	FLYBACK TRANS BSC25-2080S or FLYBACK TRANSFORMER JF0501-2402	LTF00CPS2018 LTF00CPXB014
T572 ▲	HORIZONTAL DRIVE TRANS LP2-004	LTH00CPA5004
T601 ▲	SWITCHING TRANS 9A02	LTT00CPKT041
TU1	TUNER UNIT TEDH9X203A or TUNER UNIT B8055AR	UTUNNTUAL021 UTUNNTUSP014
VR661 ▲	CARBON P.O.T. 10k Ω B(H) or ▲ CARBON P.O.T. 10k Ω B	VRCB103HH009 VRCB103KA011
W601 ▲	AC CORD 9806190 or ▲ AC CORD LA-2145	WAC0172AS004 WAC0172LW005
WH301A	WIRE HOLDER 5P HWT0200-05 or WIRE HOLDER 5P 51048-0500	XW0HT05C7001 XW01D05NF001
WH301B	WIRE HOLDER 5P HWT0200-05 or WIRE HOLDER 5P 51048-0500	XW0HT05C7001 XW01D05NF001

### CRT CBA

Ref. No.	Description	Part No.
	CRT CBA Consists of the following	-----
<b>CAPACITORS</b>		
C501	CHIP CERAMIC CAP. B K 120pF/50V	CHE1JKB0B121
C502	CHIP CERAMIC CAP. B K 100pF/50V	CHE1JKB0B101
C503	CHIP CERAMIC CAP. B K 180pF/50V	CHE1JKB0B181
C504	ELECTROLYTIC CAP. 47μF/16V M	CE1CMASL470
C510	CERAMIC CAP. B K 1000pF/2kV or CERAMIC CAP. B K 1000pF/2kV or CERAMIC CAP. 0.001μF/2kV	CA3D102MR030 CCD3DKDOB102 CCD3DKP0B102
<b>CONNECTOR</b>		
CN501	PIN CONNECTOR 005P-5100	JTEA001TG001
<b>DIODES</b>		
D501	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D502	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T

Ref. No.	Description	Part No.
D503	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
D520	SWITCHING DIODE 1N4148 or SWITCHING DIODE 1SS133(T-77) or DIODE 1SS176TPA7	NDTZ001N4148 QDTZ001SS133 1SS176T
<b>COILS</b>		
L501	INDUCTOR 180μH-J-5FT or INDUCTOR 180μH-K-5FT	LLARJCSU181 LLARKDSKA181
<b>TRANSISTORS</b>		
Q501	TRANSISTOR 2SC3468(D)-AE or TRANSISTOR 2SC2271(E)-AE or TRANSISTOR 2SC3468(E)-AE or TRANSISTOR 2SC2482 TPE6 or TRANSISTOR 2SC2271(D)-AEMP	QQSD02SC3468 QQSE02SC2271 QQSE02SC3468 QQSZ02SC2482 2SC2271DZ
Q502	TRANSISTOR 2SC3468(D)-AE or TRANSISTOR 2SC2271(E)-AE or TRANSISTOR 2SC3468(E)-AE or TRANSISTOR 2SC2482 TPE6 or TRANSISTOR 2SC2271(D)-AEMP	QQSD02SC3468 QQSE02SC2271 QQSE02SC3468 QQSZ02SC2482 2SC2271DZ
Q503	TRANSISTOR 2SC3468(D)-AE or TRANSISTOR 2SC2271(E)-AE or TRANSISTOR 2SC3468(E)-AE or TRANSISTOR 2SC2482 TPE6 or TRANSISTOR 2SC2271(D)-AEMP	QQSD02SC3468 QQSE02SC2271 QQSE02SC3468 QQSZ02SC2482 2SC2271DZ
<b>RESISTORS</b>		
R501 ▲	FIXED METAL OXIDE FILM RES. 1W J 15k Ω or FIXED METAL OXIDE FILM RES. 1W J 15k Ω or METAL RESISTOR 1W J 15k Ω or METAL RESISTOR 1W J 15k Ω	RN01153DP003 RN01153KE007 RN01153UB001 RN01153ZU001
R502 ▲	FIXED METAL OXIDE FILM RES. 1W J 15k Ω or FIXED METAL OXIDE FILM RES. 1W J 15k Ω or METAL RESISTOR 1W J 15k Ω or METAL RESISTOR 1W J 15k Ω	RN01153DP003 RN01153KE007 RN01153UB001 RN01153ZU001
R503 ▲	FIXED METAL OXIDE FILM RES. 1W J 15k Ω or FIXED METAL OXIDE FILM RES. 1W J 15k Ω or METAL RESISTOR 1W J 15k Ω or METAL RESISTOR 1W J 15k Ω	RN01153DP003 RN01153KE007 RN01153UB001 RN01153ZU001
R504	CARBON RES. 1/4W J 1.5k Ω or CARBON RES. 1/6W J 1.5k Ω	RCX4JATZ0152 RCX6JATZ0152
R505	CARBON RES. 1/4W J 1.5k Ω or CARBON RES. 1/6W J 1.5k Ω	RCX4JATZ0152 RCX6JATZ0152
R506	CARBON RES. 1/4W J 1.5k Ω or CARBON RES. 1/6W J 1.5k Ω	RCX4JATZ0152 RCX6JATZ0152
R507	CARBON RES. 1/4W J 1.5k Ω or CARBON RES. 1/6W J 1.5k Ω	RCX4JATZ0152 RCX6JATZ0152
R508	CARBON RES. 1/4W J 1.5k Ω or CARBON RES. 1/6W J 1.5k Ω	RCX4JATZ0152 RCX6JATZ0152
R511	CHIP RES. 1/10W J 3.3k Ω or CHIP RES. 1/8W J 3.3k Ω	RRXAJB6Z0332 RRX8JB6Z0332
R512	CHIP RES. 1/10W J 3.3k Ω or CHIP RES. 1/8W J 3.3k Ω	RRXAJB6Z0332 RRX8JB6Z0332
R513	CHIP RES. 1/10W J 3.3k Ω or CHIP RES. 1/8W J 3.3k Ω	RRXAJB6Z0332 RRX8JB6Z0332
R514	CARBON RES. 1/4W J 1.5k Ω or CARBON RES. 1/6W J 1.5k Ω	RCX4JATZ0152 RCX6JATZ0152
R516	CHIP RES. 1/10W J 33 Ω or CHIP RES. 1/8W J 33 Ω	RRXAJB6Z0330 RRX8JB6Z0330
R517	CHIP RES. 1/10W J 560 Ω or CHIP RES. 1/8W J 560 Ω	RRXAJB6Z0561 RRX8JB6Z0561
R518	CHIP RES. 1/10W J 33 Ω or CHIP RES. 1/8W J 33 Ω	RRXAJB6Z0330 RRX8JB6Z0330
R519	CHIP RES. 1/10W J 560 Ω or CHIP RES. 1/8W J 560 Ω	RRXAJB6Z0561 RRX8JB6Z0561
R520	CHIP RES. 1/10W J 33 Ω or CHIP RES. 1/8W J 33 Ω	RRXAJB6Z0330 RRX8JB6Z0330



Ref. No.	Description	Part No.
R521	CHIP RES. 1/10W J 560 $\Omega$ or CHIP RES. 1/8W J 560 $\Omega$	RRXAJB6Z0561 RRX8JB6Z0561
R531	CARBON RES. 1/4W J 100 $\Omega$ or CARBON RES. 1/6W J 100 $\Omega$	RCX4JATZ0101 RCX6JATZ0101
R532	CARBON RES. 1/4W J 100 $\Omega$ or CARBON RES. 1/6W J 100 $\Omega$	RCX4JATZ0101 RCX6JATZ0101
R533	CARBON RES. 1/4W J 100 $\Omega$ or CARBON RES. 1/6W J 100 $\Omega$	RCX4JATZ0101 RCX6JATZ0101
<b>MISCELLANEOUS</b>		
CLN501	PARALLEL WIRE L=250 4P	WX1L1000-001
JK501 ▲	CRT SOCKET ISMS02S	JSCC220PK003
WH501A	WIRE HOLDER 4P HWT0200-04 or WIRE HOLDER 4P 51048-0400	XW0HT04C7001 XW01D04NF001
WH501B	WIRE HOLDER 4P HWT0200-04 or WIRE HOLDER 4P 51048-0400	XW0HT04C7001 XW01D04NF001

